WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES
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GEOLOGIC MAP OF WASHINGTON STATE

by J. Eric Schuster

WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES

GEOLOGIC MAP GM-53

2005

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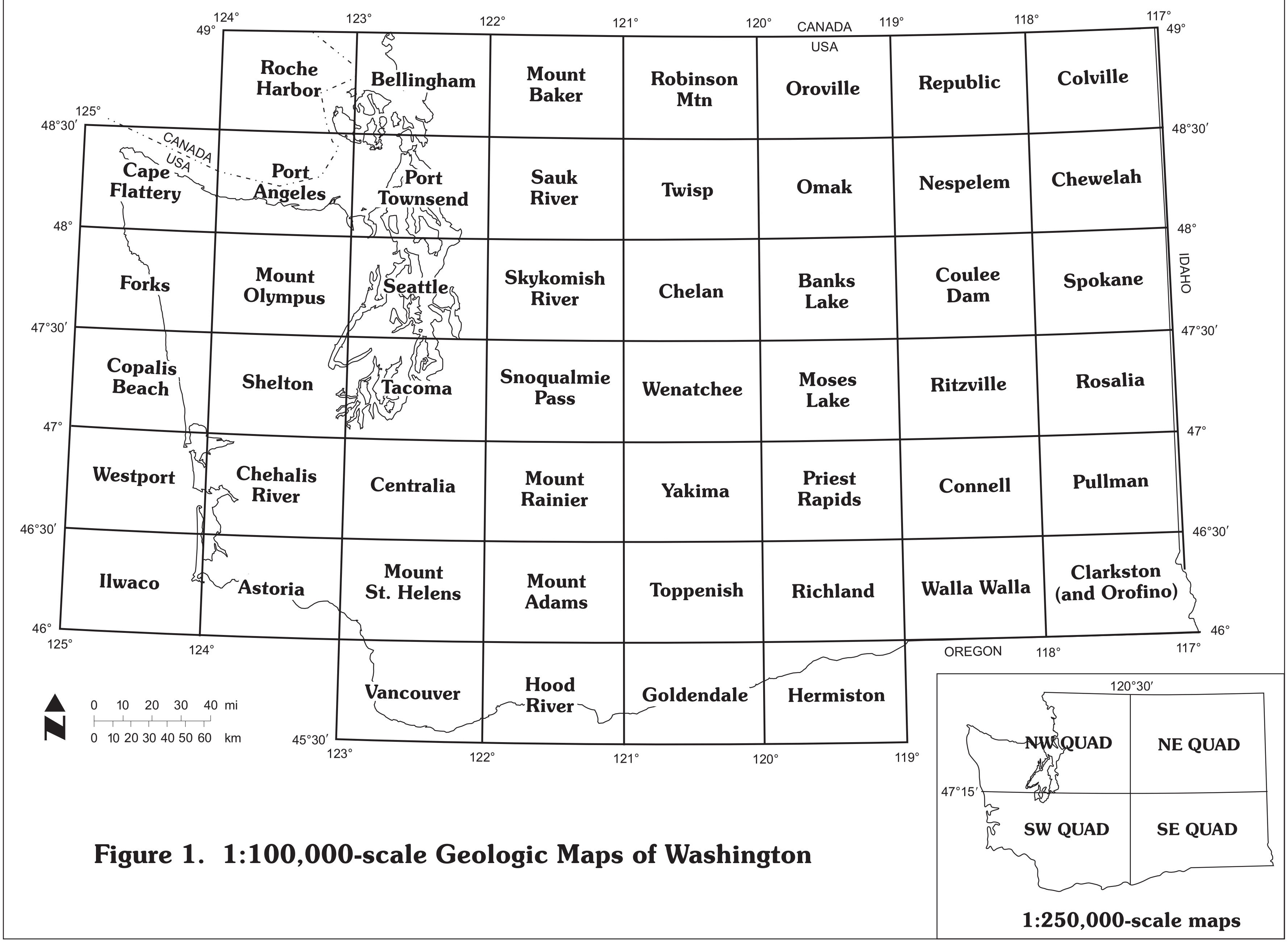

Figure 1. 1:100,000-scale Geologic Maps of Washington

GEOLOGIC MAP OF WASHINGTON STATE

by J. Eric Schuster

MAP COMPILATION AND PRODUCTION

The 1:500,000-scale geologic map of Washington was compiled entirely from the preceding 1:250,000-scale geologic quadrant maps of Washington (Fig. 1) (Walsh and others, 1987; Stoffel and others, 1991; Schuster and others, 1997; Dragovich and others, 2002). The level of detail was simplified by combining the 1:250,000-scale map units into 1:500,000-scale map units that have broader lithologic and age ranges and by deleting small lakes and small polygons of unconsolidated sedimentary map units. Table 1 (p. 12) shows which 1:250,000 units make up each of the 1:500,000 units. The reader will notice that a few 1:250,000 map units listed in Table 1 do not fit entirely within the age range or lithologic range of the 1:500,000 unit. This was done to avoid 1:500,000 units with very limited extents and to reduce the number of 1:500,000 units. Typically, a 1:250,000 unit that does not fit was lumped with an appropriate 1:500,000 lithologic unit, but its age extends outside the range of the 1:500,000 unit. Also, typically, the 'young' end of the age range of the 1:250,000 unit fits within the age range of the 1:500,000 unit, but the 'old' end extends beyond the age range of the 1:500,000 unit. For example, 1:500,000 unit Mzmt includes 1:250,000 unit pTog (NE), which extends into the Precambrian, and unit pTog (NW), which extends into the Paleozoic. Although the map units have been simplified for presentation at 1:500,000 scale, the faults, folds, dikes, and eruptive centers generally have not. In complex, crowded areas some folds and some ornaments that identify fault types were omitted to preserve legibility.

The 1:250,000-scale quadrant maps cited above were, in turn, compiled mostly from 1:100,000-scale geologic maps (Fig. 1) compiled by geologists of the Washington Division of Geology and Earth Resources or the U.S. Geological Survey. The 1:100,000-scale maps are referenced in the pamphlets that accompany the 1:250,000-scale quadrant maps. The 1:100,000-scale quadrangle index map (Fig. 1) and lines of latitude and longitude on the 1:500,000-scale geologic map plate are included as an aid to readers who wish to be able to identify which 1:100,000-scale quadrangle(s) contain a geologic feature of interest.

Small index maps of the State of Washington accompany each of the map unit symbols and brief descriptions in the 'Key to Geologic Units' on the plate. Each index map serves two purposes: it shows the color of the map unit, and it shows the distribution of the unit. Showing the distribution of each map unit this way is an idea borrowed from the Pennsylvania geologic map (Miles, 2003), but using the index map to show the color of the unit may be original.

The 1:500,000-scale geologic map of Washington was prepared using digital methods. Digital versions of the 1:250,000-scale geologic quadrant maps were merged and simplified using ArcInfo and ArcGIS. The plate was prepared for publication in Adobe Illustrator, and the pamphlet was first prepared in Microsoft Word, then laid out for printing in Ventura Publisher.

DESCRIPTIONS OF MAP UNITS

Each map unit description is presented in sections; each section covers the age range of one or more component units of the source 1:250,000-scale geologic quadrant map(s). For example, the description for unit QTc, Quaternary–Tertiary continental sedimentary rocks and deposits, includes sections for Pleistocene–Pliocene, Quaternary–Pliocene, and Quaternary–Miocene components. This approach provides more detailed age information and facilitates presentation of more lithologic information with greater clarity than if the description were presented in a single, summary section. Except as indicated by 'local', 'locally', 'subordinate', or 'rare', the descriptions do not necessarily indicate relative abundance of component lithologies.

All but one of the unit descriptions (unit Qd, dune sand) include an array of numbers, listed by quadrant. Each number links to a named geologic unit in Table 2 (p. 17). Where 'Includes named units:' is used, the unit includes both named and unnamed components. Where 'Consists of named units:' is used, the unit is composed entirely of named components.

Unconsolidated Sediments

Qd **Holocene dune sand** — **Holocene** well-sorted, fine to medium sand and silt in active and stabilized dunes; locally includes volcanic ash.

Qa **Quaternary alluvium** — **Quaternary** unconsolidated or semiconsolidated alluvial clay, silt, sand, gravel, and (or) cobble deposits; locally includes peat, muck, and diatomite; locally includes beach, dune, lacustrine, estuarine, marsh, landslide, lahar, glacial, or colluvial deposits; locally includes volcaniclastic or tephra deposits; locally includes modified land and artificial fill. *Includes named units*: **NW** part of 211, part of 256, part of 611, part of 658, part of 670, part of 897, and part of 932; **SW** 4, 187, 413, part of 414, part of 430, part of 670, and 769.

Qls **Quaternary mass-wasting deposits** — **Quaternary** mass-wasting deposits; primarily landslide deposits, but locally includes talus, colluvium, protalus ramparts, and rock glaciers; includes 1980 debris avalanche of Mount St. Helens; locally includes **Pliocene–Miocene** mass-wasting deposits. *Includes named unit:* **SW** 556.

Ql **Quaternary loess** — **Quaternary** eolian silt and fine sand; includes clay, caliche, tephra, and paleosols; locally includes outburst flood deposits. *Includes named units:* **NE** 629; **SE** 629.

Qf **Pleistocene outburst flood deposits** — **Pleistocene** gravel and sandy gravel deposits with interbedded silt lenses; deposited as benches along the main stem of the Snake River as a result of rapid draining of glacial Lake Bonneville; also widespread silt, sand, gravel, and boulder deposits deposited during multiple catastrophic drainings of glacial Lake Missoula; includes glaciolacustrine deposits. *Includes named units:* **NE** 261 and 589; **NW** part of 897; **SE** 61, 330, 523, 638, and 864; **SW** 520.

Qgd **Pleistocene continental glacial drift** — **Pleistocene** till and outwash clay, silt, sand, gravel, cobbles, and boulders deposited by or originating from continental glaciers; locally includes peat, nonglacial sediments, modified land, and artificial fill. *Includes named units:* **NW** 14, 156, 197, part of 211, 252, part of 256, 493, part of 611, 635, part of 658, part of 670, part of 725, 810, 822, part of 897, and part of 932; **SW** 155, 348, 617, part of 725, 804, 817, and 896.

Qad **Pleistocene alpine glacial drift** — **Quaternary** till, outwash, and glaciolacustrine sediments; locally includes loess, talus, and lacustrine deposits. *Includes named units:* **NW** part of 133, 210, part of 254, 320, 360, part of 378, part of 414, part of 430, 472, 473, 497, part of 524, 564, 768, 877, part of 920, part of 921, 931, and 957; **SW** 8, 85, part of 133, part of 254, 285, 343, part of 378, part of 414, part of 430, 455, 461, 503, part of 524, part of 920, part of 921, 940, and 950.

Sedimentary Rocks and Deposits

QTc **Quaternary–Tertiary continental sedimentary rocks and deposits** — **Quaternary–Pliocene** conglomerate with sandy and silty facies. **Quaternary–Miocene** pebble, cobble, and boulder gravel. **Pleistocene–Pliocene** gravel, sand, silt, and clay; deposits of the ancestral Columbia River. *Includes named units:* **SE** 18, 140, 141, 143, and 311; **SW** 830 and 871.

Tc **Tertiary continental sedimentary rocks** — **Pliocene** poorly indurated coarse sand and gravel stream terrace deposits; weakly cemented, moderately sorted cobble to pebble gravel with thin sand, silt, clay, and tephra interbeds. **Pliocene–Miocene** conglomerate (Pleistocene and Pliocene in Stoffel and others, 1991; now known to be Pliocene and Miocene, Schuster and others, 1997), pebble to cobble fanglomerate; fine and coarse semi-indurated fluvial and lacustrine deposits; locally includes mass-wasting deposits, diatomite beds, and tephra beds; locally fossiliferous. **Miocene** sandstone, siltstone, conglomerate, carbonaceous shale, claystone, and debris-flow breccia; commonly tuffaceous; locally includes tuff breccias, lahars, lignite, peat, and diatomite beds. **Oligocene** sandstone, variegated tuffaceous shale, and conglomerate with minor silicic tuff. **Oligocene–Eocene** sandstone, pebble and cobble conglomerate, siltstone, shale, claystone, and coal. **Middle and upper Eocene** feldspathic sandstone, siltstone, shale, conglomerate, and rare crystal-lithic tuff. **Lower and middle Eocene** interbedded shale, feldspathic sandstone and siltstone, and conglomerate; local minor crystal tuff and porphyritic dacite and rhyolite flows. **Eocene** conglomerate, commonly lithofeldspathic to feldspatholithic sandstone, siltstone, shale, mudstone, claystone, and coal; locally interbedded with basaltic to rhyolitic tuffaceous and pumiceous sandstone and tuff, volcaniclastic breccias, and lava flows; local fanglomerate and brackish-water deposits. *Includes named units:* **NE** 68, part of 96, 137, part of 245, part of 396, part of 435, 578, part of 602, part of 704, part of 831, 857, and 925; **NW** part of 30, 56, part of 79, 134, part of 136, part of 245, 328, 382, part of 576, 667, 699, part of 712, 832, and 858; **SE** 50, 149, part of 245, part of 435, 443, 447, 476, 677, 690, part of 704, 734, 778, 797, part of 831, part of 849, and 895; **SW** 92, 112, 186, 224, part of 245, 459, 484, 494, part of 575, 666, part of 712, 792, 825, part of 831, part of 849, and 946.

Mzc **Mesozoic continental sedimentary rocks** — **Tertiary and Cretaceous** shale, feldspathic sandstone and siltstone, and conglomerate. **Upper Cretaceous** lithofeldspathic sandstone with siltstone and shale partings; interbedded chert-grain sandstone, black mudstone and siltstone, and conglomerate; conglomerate; subordinate volcanic sandstone and conglomerate. **Cretaceous** lithofeldspathic sandstone to chert-lithic sandstone, siltstone, and conglomerate; cobble conglomerate; chert-pebble conglomerate with minor sandstone and siltstone. **Lower Cretaceous** conglomerate with sedimentary and metavolcanic rock clasts; subordinate feldspathic sandstone, volcanic sandstone, and black mudstone. *Consists of named units:* **NE** part of 512, 639, 652, 784, 900, part of 903, and 953; **NW** 174, 203, 299, 336, part of 513, 774, part of 850, 901, and part of 952.

Tn **Tertiary nearshore sedimentary rocks** — **Pliocene–Miocene** siltstone, sandstone, and conglomerate; fossiliferous, concretionary, and carbonaceous. **Miocene** micaceous feldspathic sandstone and conglomerate with minor siltstone; locally pebbly, bioturbated, and (or) cross-bedded; commonly carbonaceous. **Oligocene–Eocene** nearshore marine to nonmarine basaltic conglomerate, sandstone, tuffaceous siltstone, pumice-lithic lapilli tuff, claystone, and lignite; basaltic sandstone, siltstone, and sandy pebble conglomerate; locally interbedded with basaltic andesite flows; commonly with coal; locally contains mica and quartz pebbles. **Eocene** marine to nonmarine micaceous feldspathic sandstone, siltstone, shale, carbonaceous siltstone, claystone, and thick coal seams; locally interbedded with basalt flows and volcaniclastic rocks. *Consists of named units:* **NW** part of 55, part of 79, 138, 674, 676; **SW** part of 175, 610, 770, and 865.

Mzn **Mesozoic nearshore sedimentary rocks** — **Cretaceous** sandstone, conglomerate, shale, and minor coal. **Cretaceous–Jurassic** volcanic-lithic pebble conglomerate and breccia with siltstone and sandstone interbeds. **Triassic** volcanic-lithic siltstone, sandstone, tuff, conglomerate, breccia, and limestone. *Includes named units:* **NW** 110, 157, 258, 334, 339, 579, 665, and 791

Tm **Tertiary marine sedimentary rocks** — **Miocene** lithofeldspathic or feldspatholithic sandstone and siltstone; common claystone, shale, and mudstone; minor conglomerate and breccia; locally tuffaceous; local basaltic sandstone and poorly sorted basal conglomerate. **Miocene–Oligocene** mudstone to sandy siltstone with calcareous concretions; conglomerate near the base; locally contains micaceous, lithic, and quartzofeldspathic sandstone. **Miocene–Eocene** breccia with lenses and angular blocks of clastic sedimentary rocks and volcanogenic rocks in a matrix of black shale or slate or intensely sheared sandstone and siltstone; lithofeldspathic and feldspatholithic micaceous sandstone, siltstone, and slate, and semischist, slate, and (or) phyllite; locally includes diapiric muds, fault breccias, and submarine landslide deposits; minor thick-bedded sandstone, and granule and pebble conglomerate; locally metamorphosed to zeolite facies. **Oligocene–Eocene** lithofeldspathic and feldspatholithic micaceous sandstone, siltstone, and slate, semischist and slate or phyllite, tuffaceous siltstone and tuffaceous sandstone; minor conglomerate, breccia, and semischist; local basaltic and glauconitic sandstone beds; locally grades to nonmarine volcaniclastic rocks; locally metamorphosed to zeolite facies. **Eocene** conglomerate, sandstone, pillow basalt, siltstone, mudstone, argillite, breccia, claystone, and shale; local interbeds of basaltic sandstone; minor limestone, tuffaceous siltstone, volcaniclastic rocks, diabase or gabbro sills, and chert pebbles; rare coal stringers; locally interbedded with tuffs and tuff breccias. **Eocene–Paleocene** lithic sandstone, semischist, siltstone, slate, granule or pebble conglomerate, and breccia, weakly metamorphosed. *Includes named units:* **NW** part of 5, part of 20, 23, 39, part of 55, 59, 71, part of 179, part of 246, 308, 361, 362, part of 379, part of 448, 454, part of 475, 483, 490, part of 528, part of 588, 671, 675, 682, 733, part of 783, 907, 908, and part of 930; **SW** part of 20, 144, part of 175, part of 180, 358, part of 379, part of 448, 502, 504, part of 528, 613, 747, 767, 811, 893, and part of 894.

Mzm **Mesozoic marine sedimentary rocks** — **Upper Cretaceous** mudstone and siltstone with minor chert-grain sandstone and chert-pebble conglomerate beds; locally abundant white lithofeldspathic sandstone interbeds; local conglomerate composed of argillite, sandstone, volcanic rock fragments, and minor chert. **Cretaceous** feldspathic sandstone, shale, and minor conglomerate composed of pebbles, cobbles, and boulders of plutonic, metamorphic, volcanic, and sedimentary rocks in a feldspathic sandstone matrix. **Lower Cretaceous** feldspathic sandstone, black shale, and minor conglomerate composed of pebbles, cobbles, and boulders of a variety of plutonic, metamorphic, volcanic, and sedimentary rocks in a feldspathic sandstone matrix. **Cretaceous–Jurassic** feldspatholithic and lithofeldspathic sandstone, siltstone, mudstone, black shale, radiolarian chert, greenstone, green tuff, and red shale; local minor conglomerate, limestone, argillite, breccia, marl, and rare coal. **Jurassic** pebble conglomerate, volcanic sandstone, sandstone, siltstone, shale, pelite, and argillite; rare, thin limestone beds. *Includes named units:* **NE** 295, 335, part of 590, part of 630, 884, and part of 903; **NW** 205, part of 264, 276, 338, 399, 481, part of 630, and 888; **SE** 165; **SW** part of 719.

Volcanic Rocks and Deposits

Qv **Quaternary volcanic rocks** — **Pleistocene–Pliocene** dacite. **Quaternary** rhyodacite, dacite, andesite, and basalt flows, flow breccias, dikes, hypabyssal intrusives, cinder and scoria cones, tephra, bombs, tuff, scoria, breccia, and rubble; local minor basaltic andesite; local agglutinate pyroclastic-flow deposits, olivine basalt, and hyaloclastite. *Includes named units:* **NW** 36, part of 53, 150,171, 207, 292, part of 422, 429, 434, 436, 533, 632, 650, 657, 820, 834, 837, and 935; **SW** 104, 531, 550, 561, 562, and 854.

QTv **Quaternary–Tertiary volcanic rocks** — **Pleistocene–Pliocene** andesite flows and breccias, basalt and basaltic andesite flows. *Includes named units:* **SW** 26, 44, 63, 357, 449, and part of 758.

Tv$_{cr}$ **Tertiary volcanic rocks, Columbia River Basalt Group** — **Miocene** generally fine-grained flood basalt flows; local invasive flood basalt sills and dikes, hyaloclastite, pillowed lava flows, and peperites; local intracanyon flows, saprolites, and pillow-palagonite complexes; local coarsely plagioclase-phyric flood basalt flows; feeder dikes in the Clarkston 1:100,000-scale quadrangle and neighboring areas; commonly interbedded with tuffaceous sandstone, siltstone, and conglomerate, most of which are parts of the Ellensburg and Latah Formations (see unit Tc). *Consists of named units:* **NE** 42, 151, 219, part of 278, part of 309, 329, part of 369, 406, part of 573, part of 662, part of 680, part of 716, part of 722, 795, part of 912, and part of 958; **NW** part of 309, part of 369, and 370; **SE** 15, part of 19, 35, 38, 75, 77, 111, 128, 146, 152, 208, 214, 234, 241, part of 242, 253, 265, part of 278, 290, 306, part of 309, 324, 383, 384, 386, 444, 456, 468, 474, 492, 508, 569, 572, 574, 618, 628, 656, 663, 679, 681, 707, 710, 711, 717, 723, 728, 735, 736, 750, 752, 754, 773, 776, 796, 843, 845, 890, 891, 892, 909, 913, 914, 917, 922, 923, 943, 951, and 959; **SW** part of 19, 90, 153, 198, part of 242, part of 278, part of 309, 571, part of 573, 623, 655, part of 662, 678, part of 680, part of 716, part of 722, 889, part of 912, 942, and part of 958.

Tv **Tertiary volcanic rocks** — **Pliocene** rhyolitic, andesitic, and basaltic altered tuff, volcanic breccia, volcanic sandstone, welded tuff, tuffaceous conglomerate, basalt and basaltic andesite flows, dacite flows and flow breccia, agglomerates, pyroclastic rocks, dikes, domes, obsidian, and lahars; local hypabyssal intrusions. **Miocene** dacite, andesite, basalt, basaltic andesite flows and flow breccia, and rhyolite; locally interbedded with volcaniclastic breccia, tuff, volcanic sandstone, and rare rhyolitic sandstone, siltstone, and coal; minor interbedded laharic breccia, conglomerate, and siltstone; rare welded vitrophyre and local basal unwelded pumice-perlite tuff. **Miocene–Oligocene** andesite flows and flow breccia; lesser interbedded volcaniclastic rocks; includes basaltic andesite and basalt flows, breccia, and well-bedded tuff; also undifferentiated volcanic rocks. **Oligocene** andesite, basaltic andesite, basalt, dacite, and rhyolite flows, flow breccia, lapilli tuff, welded tuff, tuff breccia, dikes, sills, domes, and plugs; locally interbedded volcaniclastic sandstone and conglomerate; local sandstone-block megabreccia. **Oligocene–Eocene** basaltic andesite flows and flow breccias, basalt and basaltic tuffs, and basalt breccia; local andesite, basalt, dacite, gabbro, diabase, greenstone, interbeds of shale, tuff, volcanic sandstone and conglomerate, and gray or brick-red limestone. **Upper Eocene** dacite and andesite flows and flow breccias with local interbeds of sedimentary or pyroclastic rocks. **Middle and upper Eocene** aphanitic volcanic rocks. **Middle Eocene** tuff, tuff breccia, dacite and andesite flows and flow breccias, and hypabyssal intrusive rocks; minor volcaniclastic and sedimentary rocks and trachyte flows; local interbeds of volcanic conglomerate, sandstone, siltstone, shale, and coal. **Eocene** rhyolite, dacite, andesite, basalt, and basaltic andesite flows, pillowed flows, flow breccia, breccia, tuff, tuff breccia, welded tuffs, domes, and volcaniclastic rocks; locally interbedded with feldspathic sandstone, conglomerate, siltstone, shale, and argillite; local gabbro and diabase; associated plugs and dikes; rare coal. *Includes named units:* **NE** part of 96, part of 289, part of 396, part of 416, 417, part of 627, 642, part of 729, 745, and part of 879; **NW** part of 5, part of 30, part of 118, part of 136, part of 179, part of 225, part of 246, part of 266, 284, 286, part of 331, 332, part of 355, 371, part of 407, part of 475, part of 541, 547, part of 576, part of 588, part of 651, 755, 818, part of 842, part of 894, and part of 930; **SW** 49, 172, 202, 204, part of 225, part of 266, 280, part of 302, 303, 318, part of 340, 515, part of 575, part of 601, part of 603, part of 758, 766, 809, 826, 839, part of 842, 851, and 939.

Tv$_{c}$ **Tertiary volcanic rocks, Crescent Formation** — **Lower to middle Eocene** dominantly submarine basalt flows and flow breccia; pillows, filled lava tubes, and altered palagonite common; locally contains thin interbeds of basaltic tuff, siltstone, chert, red argillite, volcaniclastic conglomerate, and limestone; local gabbro dikes and sills; rare andesite, dacite, and rhyolite; the marine, pillow-dominated lower part grades into flow-dominated, locally columnar-jointed, partially nonmarine rocks near the top. *Consists of named units:* **NW** part of 179; **SW** part of 180.

Mzv **Mesozoic volcanic rocks** — **Paleocene–Cretaceous** subquartzose and quartzose sandstone interbedded with argillite, chert, metabasalt, pillow basalt, basalt breccia, mudflow breccia, conglomerate, and mélange. **Pre-Tertiary** altered rhyolite. **Upper Cretaceous** andesite and dacite flows, breccia, tuff, volcanic sandstone, and lithofeldspathic sandstone, with subordinate volcanic conglomerate and sandstone, and minor shale and andesite flows. **Cretaceous** andesite and dacite breccia, tuff, and flows, with minor tuffaceous chert-pebble conglomerate and coarse cross-bedded tuffaceous or volcaniclastic sandstone. **Cretaceous–Jurassic** andesitic and dacitic tuff, tuff breccia, and flows, locally interlayered with thin- to very thick-bedded volcaniclastic or tuffaceous siltstone, sandstone, and conglomerate; local subordinate rhyolitic tuff and tuff breccia; local minor thin lenticular beds of tuffaceous mudstone; local minor limestone; locally includes chert and argillite. **Jurassic** keratophyre to spilite porphyritic flows, flow breccias, and tuffs; also a greenstone unit consisting of pillowed lavas and minor shale interbeds. **Jurassic–Permian** greenstone with local pillows and minor tuff and breccia, volcanic-lithic sandstone, argillite, limestone, ribbon chert, and rare gabbro. *Includes named units:* **NE** 52, 73, 394, part of 512, part of 590, 906, and 955; **NW** part of 264, 300, 372, part of 513, 535, and part of 850; **SW** part of 719.

Qvt **Quaternary fragmental volcanic rocks and deposits (includes lahars)** — **Holocene** dacitic to andesitic pyroclastic flow deposits of 1980 Mount St. Helens eruptions, mostly poorly sorted, ash-sized, crudely graded deposits of glass shards, pumice, broken phenocrysts, and lithic fragments and lesser lapilli- to block-sized pumice and lithic fragments. **Quaternary** pyroclastic deposits, debris flows, laharic deposits, tephra, ash, pumice, near-vent fragmental deposits, and fluvial gravel, sand, and silt; local rockfall breccia, caldera-collapse megablocks, cross-cutting andesite dikes, welded tuff, and irregular intrusions; minor lacustrine deposits; rare dacite flows. *Includes named units:* **NW** 22, part of 53, 131, 223, 291, 411, part of 422, 471, 510, part of 619, 819, 835, 934, 936, and 937; **SW** 240, 319, 446, 557, 558, 559, 560, 570, part of 619, 631, 649, 866, 870, and 945.

Tvt **Tertiary fragmental volcanic rocks** — **Pliocene** poorly consolidated pyroclastic debris, dacitic welded tuff and tuff breccia, and volcanic breccia. **Miocene** rhyolitic, andesitic, and dacitic volcaniclastic breccia and conglomerate, welded and nonwelded tuff, tuff breccia, volcanic sandstone and siltstone, rhyodacitic crystal-lithic ash-flow tuff; minor coal beds; local dacite and rhyolite plugs and flows. **Miocene–Oligocene** rhyolitic to dacitic welded to nonwelded tuff, ash-flow tuff, tuff breccia, and breccia; tuff, tuff breccia; minor silicic lava flows and volcanic conglomerate and sandstone deposited by debris flows, mudflows, pyroclastic flows, and fluvial reworking of volcanic deposits. **Oligocene** rhyolitic, andesitic, dacitic, and basaltic tuff, tuff breccia, and breccia; volcanic siltstone, sandstone, and conglomerate; local dacitic, andesitic, and basaltic flows or plugs. **Oligocene–upper Eocene** welded and nonwelded dacitic(?) tuff and tuff breccia. **Lower Oligocene–upper Eocene** tuff, volcanic sandstone, and conglomerate or breccia, interbedded with basaltic andesite flows and, at base of unit, with feldspathic sandstone, shale, and coal. **Middle and upper Eocene** volcanic conglomerate and tuffaceous sandstone, siltstone, and shale; tuff and tuff breccia; local dacitic and andesitic flows and breccia. Eocene andesitic and basaltic volcaniclastic breccia, tuff, tuff breccia, conglomerate, volcanic sandstone, and siltstone; local andesite flows, pillow lava, marine siltstone, shale, quartzose or feldspathic sandstone, mudflow deposits, impure coal beds, rhyolitic tuff, and welded tuff. **Lower and middle Eocene** tuff, tuffaceous sandstone, siltstone, and volcanic conglomerate; subordinate tuff breccia; local feldspathic sandstone and carbonaceous shale interbeds. *Includes named units:* **NE** part of 96, part of 289, part of 416, 418, 419, part of 602, part of 627, part of 729, and part of 879; **NW** 51, 66, part of 118, 167, part of 179, 226, part of 266, part of 331, part of 355, 423, 428, part of 475, 540, part of 541, 549, 604, part of 651, 689, 714, part of 783, and 873; **SW** 81, 84, part of 175, part of 225, part of 245, part of 302, part of 340, 377, 514, 516, part of 601, part of 603, 625, 640, 687, 688, 788, 789, and 808.

Intrusive Rocks

Qi **Quaternary intrusive rocks** — **Quaternary** andesite and dacite plugs, domes, dikes, and vent complexes. *Includes named units:* **SW** 86, 404, 551, 563, and 874.

QTi **Quaternary–Tertiary intrusive rocks** — **Pleistocene–Pliocene** dacite, andesite, and basaltic andesite domes, plugs, and dikes. *Includes named units:* **SW** 297 and 321.

Ti **Tertiary intrusive rocks** — **Pliocene** andesite, dacite and dacite breccia, quartz diorite, quartz monzodiorite, granite, granodiorite, quartz monzonite, and diorite stocks, plugs, domes, and dikes. **Pliocene–Miocene** biotite-hornblende-hypersthene dacite plugs and dikes; includes altered breccia and flows. **Miocene** granite, granodiorite, quartz monzonite, diorite, gabbronorite, tonalite, quartz monzodiorite, gabbro, quartz diorite, aplite, rhyolite, dacite, andesite, basaltic andesite, basalt, and diabase sills, dikes, plugs, stocks, and cupolas, vitrophyres, and intrusive breccias; minor rhyodacite and alaskite. **Miocene–Oligocene** gabbro, diorite, dacite, granite, granodiorite, tonalite, quartz gabbro, andesite, basalt, and diabase stocks, sills, dikes, dike swarms, domes, and intrusive breccia; local tuffs and breccias with both extrusive and intrusive characteristics; local granophyre and mafic inclusions; minor monzodiorite. **Oligocene** tonalite, quartz diorite, gabbro, diorite, granite, granodiorite, agmatite, granophyre, rhyolite, andesite, and dacite sills, dikes, and stocks; local alaskite and quartz monzodiorite. Eocene dacite, rhyodacite, granite, granodiorite, quartz diorite, diorite, quartz monzonite, tonalite, monzodiorite, gabbro, quartz gabbro, malignite, shonkinite, pyroxenite, quartz monzodiorite, monzonite, syenite, foyaite, trachyte, rhyolite, andesite, basalt, diabase, and lamprophyre dikes, sills, dike swarms, plugs, stocks, and plutons; local alaskite-aplite-pegmatite and miarolitic cavities. **Paleocene** tonalite; common alaskite-aplite-pegmatite dikes and sills; locally grades to tonalitic gneiss or trondhjemite. *Includes named units:* **NE** 32, 69, 82, 148, part of 154, 166, 170, 192, 200, 201, part of 221, 247, 268, 279, 298, 315, 349, 350, 351, 356, 367, 380, part of 396, 401, 412, 452, 458, part of 464, 466, part of 529, 552, 593, part of 621, 732, 739, 746, 756, 806, 812, 836, and 928; **NW** 25, part of 30, 33, 40, 89, 97, 102, 122, 123, 127, 130, 145, 160, 163, 168, 169, part of 179, 191, 199, 215, part of 221, 237, 248, 281, 304, 305, 312, 323, 364, 365, 366, 373, 385, 387, 391, part of 407, 425, 433, 450, 470, 479, 511, 517, 527, part of 529, 537, 539, part of 541, 542, 545, 548, 554, 594, 609, 622, 646, 653, 659, 683, 686, 694, 720, 721, 726, 731, 740, 751, 753, 761, 779, 799, 828, 841, and 869; **SW** 80, 91, 142, 486, 496, 532, 616, 645, 730, 757, 772, 793, 840, 938, and 947.

TKi **Tertiary–Cretaceous intrusive rocks** — **Tertiary–Cretaceous** granite, granodiorite, quartz monzonite, tonalite, alaskite-aplite-pegmatite, gabbro, and granitic orthogneiss in dikes, sills, pods, and irregular masses; local metagabbro, ultramafic rocks, and quartz monzonite orthogneiss; locally cut by aplite dikes. *Includes named units:* **NE** 13, 16, part of 154, 176, 185, 267, 288, part of 402, part of 408, 409, part of 464, 485, 499, 530, part of 538, part of 555, 567, 612, 813, and 833; **NW** 718, 760, and part of 763.

Mzi **Mesozoic intrusive rocks** — **Tertiary and Cretaceous** diorite. **Pre-Tertiary** granodiorite and granite; gabbro and interlayered mafic tonalite. **Cretaceous** tonalite, granodiorite, granite, quartz monzonite, alaskite to pegmatite gneiss, metagranodiorite, granodioritic gneiss, alaskite-aplite-pegmatite, muscovite-biotite granite, gabbro, diorite, quartz diorite, porphyritic dacite and andesite dikes and sills, hornblendite, gneissic granodiorite; local trondhjemite, metatonalite, metadiorite, pegmatite dikes, miarolitic cavities, schist, pyroxenite, ultramafite, anorthosite, quartz gabbro, and gneissic amphibolite inclusions; locally foliated or gneissose. **Cretaceous–Jurassic** granodiorite, quartz diorite, gabbro, quartz monzonite, diorite, monzodiorite, troctolite, gabbronorite, anorthosite, pyroxenite, and porphyritic rocks; locally subordinate tonalite; local minor alaskite-aplite-pegmatite pods and dikes, marble, gneiss, schist, orthogneiss, and quartz veins. **Jurassic** gabbro, diorite, trondhjemite, granite, quartz diorite, diabase, malignite, shonkinite, nepheline syenite, pyroxenite, tonalite, granodiorite, quartz monzonite, metatonalite, metadiabase, metagabbro, metadiorite, metagranodiorite, ultramafic rocks, porphyritic quartz diorite, and metaquartz-diorite; local dacite, andesite, basalt, and monzonite; locally abundant quartz diorite and trondhjemite dikes; local minor alaskite-aplite-pegmatite pods and dikes; locally includes many other minor lithologies. **Triassic** granodiorite, quartz monzodiorite, metagabbro, metadiorite, greenstone, quartz diorite, tonalite, and metatonalite; local subordinate olivine-bearing metagabbro and metanorite; local quartz monzonite, tonalite gneiss, flaser gneiss, chlorite schist, metadiorite, diorite, and hornblendite. **Mesozoic** gabbro with minor peridotite. *Includes named units:* **NE** 2, 3, 10, 31, 57, 58, 64, 67, 74, 87, part of 93, 94, 103, part of 114, part of 117, part of 132, part of 154, 158, 162, 188, 218, 222, 236, 249, 255, 260, 262, 263, 270, 274, 283, 294, 313, 327, 368, 381, 405, part of 408, 421, 432, 437, 453, 457, 463, part of 464, 498, 506, part of 538, part of 555, part of 606, 633, part of 637, 648, 654, 661, 693, 709, 727, 741, 742, 759, 782, part of 786, 794, 802, 814, part of 824, part of 827, 847, part of 860, 902, part of 910, 919, 933, and 956; **NW** 27, 43, part of 54, 72, part of 93, part of 113, 139, 184, 206, 212, 227, part of 229, part of 230, 250, 251, part of 264, 271, 272, 273, 317, 333, 342, 353, 354, part of 347, part of 392, 403, 445, 467, 478, part of 489, 525, 565, part of 637, 702, 703, 708, 738, 771, part of 821, 838, 846, and part of 929; **SE** 314; **SW** part of 390, 644, and 673.

Pzi **Paleozoic intrusive rocks** — **Mesozoic–Paleozoic** metagabbro, diabase, and tonalite. **Pennsylvanian** gabbro, quartz diorite, and granodiorite. **Ordovician** gabbro and minor greenstone. **Paleozoic** gabbro, diorite, quartz diorite, tonalite, trondhjemite, diabase, subordinate greenstone, and rare pyroxenite; local orthogneiss and metamorphosed basaltic to silicic dikes. *Includes named units:* **NE** 600 and 878; **NW** part of 867, 875, and part of 960.

pCi **Precambrian intrusive rocks** — **Proterozoic Z** metagabbro and greenstone; forms abundant dikes and sills in Proterozoic Y and Z metasedimentary rocks. **Proterozoic Y** metadiorite and metagabbro; forms abundant sills in Proterozoic Y metasedimentary rocks.

MzPzu **Mesozoic–Paleozoic ultramafic rocks** — Rocks of uncertain age: dunite, peridotite, pyroxenite, serpentinite, and altered ultrabasic (ultramafic) rocks; locally cut by thin veins of chrysotile asbestos; locally intercalated with greenstone and metatuff. **Pre-Tertiary** dunite, serpentinite, partially serpentinized dunite, peridotite, pyroxenite, talc schist, and harzburgite. **Jurassic** serpentinite, peridotite, and dunite; locally with layers of chromite; occurs as mélange matrix or as dismembered blocks of ophiolite. *Includes named units:* **NE** 70, part of 132, and 634; **NW** part of 45, part of 230, part of 264, part of 347, part of 392, part of 397, part of 451, 883, and part of 929.

Metasedimentary and Metavolcanic Rocks

Mzms **Mesozoic metasedimentary rocks — Pre-Tertiary** metaconglomerate; locally interbedded with metasandstone and meta-argillite; locally includes chert-pebble conglomerate. **Cretaceous** metaconglomerate or conglomeratic quartzite, in which boulder to pebble clasts are mostly metachert; locally includes feldspathic metasandstone, minor metasiltstone, and rare fossilized wood debris; quartzite locally intercalated with kyanite-staurolite-garnet schist and locally intruded by metatonalite. **Pre-Cretaceous** orthoquartzite with local minor schist, locally metaconglomeratic. **Cretaceous–Jurassic** chert, metachert, metasandstone, cherty metasandstone, argillite, mudstone, and conglomerate; locally contains shaly interbeds, semischist, phyllite, limestone, vesicular pillowed greenstone, tuff, breccia, diabase, gabbro, phyllitic siltstone, and metaconglomerate; rare limy siltstone, serpentinite and marble pods, and concretions. **Jurassic** meta-argillite, slate, phyllitic argillite, volcanic-lithic metasandstone, semischistose sandstone, phyllite, greenschist, blueschist, iron-manganese quartzite, metaconglomerate; locally includes metasandstone, metamorphosed flows and breccias, metachert, marble, serpentinite, cataclastic sandstone, calcareous phyllite, quartzose mica schist, metatuff, magnesian schists, talc schists, metasiltite, metawacke, metavolcanic rocks, ironstone, and ferruginous quartzite; locally cut by deformed and brecciated metadacite dikes; locally contains abundant quartz veins or lenses. **Jurassic–Triassic** metamorphosed ribbon chert and metamorphosed tuffaceous siltstone, sandstone, and argillite; locally contains quartzite, meta-argillite, pillow basalt, basaltic tuff, greenstone, phyllitic slate, minor marble, and rare metaconglomerate. **Triassic** limestone, dolomite, phyllite, metalimestone, metadolomite, and metasiltite; local interbeds of meta-argillite, quartzite, metaconglomerate, and minor greenstone; local discontinuous bodies of serpentinite and magnesitic metadolomite; local carbonaceous beds and coarse reef debris. **Mesozoic** schist to phyllite with local amphibolite, chert, greenschist, marble, hornfels, pyroxenite, peridotite, serpentinite, and semischist. *Includes named units:* **NE** 106, 107, 108, 109, part of 159, part of 244, part of 269, and part of 713; **NW** 28, 161, 181, part of 182, 189, 190, part of 229, part of 233, part of 243, part of 296, part of 347, part of 392, part of 397, part of 451, part of 465, part of 469, 546, 595, 615, 647, 705, 748, 785, 823, part of 863, 904, and part of 929; **SE** 491; **SW** 232.

Pzms **Paleozoic metasedimentary rocks — Triassic and Permian** meta-argillite, metasiltite, metawacke, and minor metalimestone and chert-pebble metaconglomerate. **Permian** metalimestone, meta-argillite, phyllite, quartzite, metawacke, and chert-pebble metaconglomerate and thin, discontinuous lenses of greenstone. **Permian–Devonian** limestone, marble, metamorphosed volcanic sandstone, siltstone, argillite, conglomerate, tuff, and rare chert. **Pre-Permian** amphibolite, greenschist, blueschist, micaceous quartzite (metachert), mica-quartz schist, and rare marble. **Carboniferous and Devonian** metalimestone, metadolomite, interbedded meta-argillite and phyllite, green phyllite, and gray quartzite; locally includes dolomitic metaconglomerate, metasiltite, minor black metachert, minor thin discontinuous lenses of chert-pebble metaconglomerate, and greenstone, and thin layers and lenses of barite. **Carboniferous to Ordovician** metaconglomerate, meta-argillite, phyllite, metachert, quartzite, metawacke, metalimestone, and minor greenstone. **Devonian** metalimestone and metaconglomerate. **Silurian** metasiltite and meta-argillite intercalated with metalimestone and metaconglomerate; minor slate. **Ordovician** meta-argillite, metasiltite, quartzite, metalimestone, metadolomite, metawacke, metaconglomerate, and phyllite; minor metachert and greenstone. **Ordovician and Cambrian** metalimestone, metadolomite, and argillaceous metalimestone; locally interbedded with meta-argillite, metasiltite, and minor quartzite. **Cambrian** metalimestone, metadolomite, phyllite, meta-argillite, and metasiltite; locally interbedded with quartzite. **Paleozoic** metaconglomerate and metawacke with minor black slate and phyllite; locally contains small masses of serpentinite and magnesitic metadolomite; local meta-argillite, metasiltite, quartzite, and discontinuous pods and lenses of metalimestone. *Includes named units:* **NE** 9, 78, part of 173, part of 269, 316, 410, 439, 480, 505, 553, 608, part of 643, 696, and 787; **NW** part of 125, 287, 543, and part of 899.

PzpCms **Paleozoic–Precambrian metasedimentary rocks — Ordovician to Proterozoic Y** phyllite, metalimestone, and feldspathic quartzite, generally thermally metamorphosed; feldspathic quartzite intercalated with metasiltite, locally metamorphosed. **Cambrian and Proterozoic Z** generally interbedded quartzite and meta-argillite and metasiltite; minor metaconglomerate and metadolomite. *Consists of named units:* **NE** 1 and 325.

pCms **Precambrian metasedimentary rocks** — **Proterozoic Z** metaconglomerate, quartzite, meta-argillite, and metasiltite, locally interbedded; local minor metalimestone, greenstone, and metadolomite. **Proterozoic Y** meta-argillite, phyllite, metasiltite, quartzite, metadolomite; minor metalimestone, metachert, phyllite, and metaconglomerate, lithologies generally interbedded; locally thermally metamorphosed to schist and hornfels; metadolomite locally magnesitic; locally cut by abundant metadiorite and metagabbro sills. **Precambrian** siltite and quartzite; local minor dolomite lenses and (or) beds; local dark argillite partings common. *Includes named units:* **NE** part of 47, 76, part of 83, 195, 235, part of 374, 375, 501, 521, part of 522, 526, 660, 664, 691, part of 692, 700, part of 701, 743, 801, 805, 815, 853, 861, 911, and part of 948; **SE** part of 47, part of 83, part of 522, part of 692, part of 701, and 816.

Mzmt **Mesozoic metasedimentary and metavolcanic rocks** — **Cretaceous** interbedded feldspathic sandstone, tuffaceous rocks, flows, and porphyritic dikes and sills with minor chert-pebble conglomerate and breccia, all metamorphosed to the greenschist facies; conglomerate, amphibolite, hornblende schist, siltstone, gabbro, mica schist, and porphyritic mafic dikes, all metamorphosed to the amphibolite facies. **Cretaceous and Jurassic** metavolcanic rocks intercalated with quartzite and meta-argillite; locally thermally metamorphosed. **Jurassic** greenstone, metachert, meta-argillite, metasandstone, and serpentinite with minor limestone, metadiabase, and metatuff. **Jurassic–Triassic** greenstone, metadacite, greenschist, greenstone breccia, quartzite, amphibolite, hornblende schist, volcanic metasandstone, chert-rich metaconglomerate, muscovite schist, marble, and tectonic pods or layers of ultramafic rocks. **Triassic** phyllite, greenstone, amphibolite, quartzite (metachert?), volcanic breccia, metabasalt, keratophyre, and volcanic sandstone; local discontinuous bodies of serpentinite and magnesitic metadolomite; locally interbedded with shale, tuff, conglomerate, and thin limestone beds; includes pillow basalt, pillow breccia, argillite, and volcaniclastic rocks. *Consists of named units:* **NE** 420 and 495; **NW** part of 229, part of 233, part of 243, part of 347, part of 469, part of 597, 885, 941, and part of 952; **SE** 216, 737, and 944.

MzPzmt **Mesozoic–Paleozoic metasedimentary and metavolcanic rocks** — **Pre-Tertiary** argillite, slate, phyllite, sandstone, semischist, ribbon chert, diorite, tonalite, silicic gneiss, fine-grained epidote-amphibolite gneiss, micaceous quartzite, quartzite, amphibole schist, greenstone, quartzitic metasedimentary rocks, amphibolitic schist, metagabbro, and plagiogranite; local tectonic blocks of igneous rocks, gneiss, schist, ultramafic rocks, and marble. **Jurassic–Permian** greenstone and metamorphosed tuff, ribbon chert, chert, and limestone with minor metasandstone, serpentinite, meta-argillite, and rare metaconglomerate. **Jurassic–Mississippian** greenstone and banded chert with subordinate metamorphosed volcanic-lithic sandstone, argillite (locally phyllitic), and minor diabase, marble, and limestone. **Jurassic–Devonian** greenstone, metamorphosed andesite, sandstone, siltstone, argillite, shale, and minor limestone. **Triassic and Permian** greenstone, meta-argillite, chert-rich metawacke, chert-pebble metaconglomerate, and minor metalimestone. *Consists of named units:* **NW** 24, part of 45, 124, 183, 193, 238, part of 867, part of 899, and part of 960.

Pzmt **Paleozoic metasedimentary and metavolcanic rocks** — **Permian–Devonian** metamorphosed argillite and volcanic sandstone, basalt to rhyolite breccia, tuff, and flows, and silicic hypabyssal rocks, local pebble conglomerate, limestone, gabbro, and rare chert. **Carboniferous and Devonian** phyllite and meta-argillite intercalated with quartzite, metalimestone, and greenstone. *Consists of named units:* **NE** part of 269 and part of 643; **NW** part of 125 and 228.

Mzmv **Mesozoic metavolcanic rocks** — **Cretaceous–Jurassic** greenstone, metadiabase, gabbro, quartz porphyry dikes, mafic tuff, argillite, volcanic-lithic sandstone, chert, and greenstone tuff, meta-andesite flows and tuffs, and tectonic blocks of pillowed greenstone in metasedimentary rocks; local minor intercalated meta-argillite, metasandstone, and metaconglomerate. **Jurassic** metabasalt and basaltic meta-andesite flows, flow breccias, greenstone, dacite to andesite flows, tuffs, and breccia with argillite interbeds; local intermediate-composition metavolcanic rocks and rare amphibolite; local thin interbeds of volcanic metaconglomerate, metawacke, meta-argillite, metasiltite, and metalimestone; local serpentinite, pyroxenite, greenschist, metamorphosed quartz diorite, silicic porphyry, micaceous quartz-feldspar schist, metatuff, tuff breccia, and tuffaceous sandstone, siltstone, and belemnite-bearing marble. **Jurassic–Triassic** metadacite. **Triassic** meta-andesite, metabasalt, and metadiabase. *Includes named units:* **NE** 105, part of 244, part of 597, 626, and part of 713; **NW** part of 182, 194, part of 230, part of 296, part of 347, part of 392, 462, part of 465, 924, and part of 929; **SW** part of 719.

Pzmv **Paleozoic metavolcanic rocks** — **Triassic–Permian** greenstone, metamorphosed pillow basalt, breccia, tuff breccia, mafic tuff, and chert; local quartzite (metachert), meta-argillite, phyllite, metawacke, and metaconglomerate interbeds, local minor pods and lenses of metalimestone. **Permian–Devonian** metamorphosed basaltic, andesitic, dacitic, and rarely rhyolitic to rhyodacitic flows, tuffs, and volcaniclastic rocks. **Carboniferous–Devonian** greenstone and greenschist. **Carboniferous–Ordovician** greenstone with pillow structures locally preserved or greenschist and phyllite. **Ordovician** intercalated greenstone, greenschist, and porphyritic metabasalt; thin, discontinuous interbeds of meta-argillite, quartzite, metawacke, and metalimestone. *Consists of named units:* **NE** part of 173 and part of 269; **NW** part of 125, 544, and 599.

pCmv **Precambrian metavolcanic rocks — Proterozoic Z** greenstone and amphibolite with minor metaconglomerate. *Consists of named units:* **NE** part of 374, 376, 441, and part of 948.

Metamorphic Rocks (Amphibolite Facies and Higher)

Mzhm **Mesozoic heterogeneous metamorphic rocks — Cretaceous** amphibolite, pegmatite, and tonalite; sills and dikes of metadiorite and metaquartz diorite. **Cretaceous–Jurassic** schist, amphibolite, and granofels; quartzite, phyllite, gneiss, metagabbro, metadiorite, quartz diorite, metaperidotite, and serpentinite. **Triassic** schist and gneiss, metavolcanic rocks, amphibolite, metaconglomerate, and marble; local greenschist facies rocks. **Mesozoic** schist, schistose amphibolite, gneiss, and marble; dikes and sills of tonalite and pegmatite. *Includes named units:* **NW** part of 99, part of 100, part of 113, part of 129, 363, part of 392, 790, and part of 863.

MzPzhm **Mesozoic–Paleozoic heterogeneous metamorphic rocks — Pre-Tertiary** quartzite, gneiss, schist, marble, calc-silicate rocks, and amphibolite; local minor pegmatite and migmatite. **Pre-Jurassic** gneiss, schist, quartzite, amphibolite, and marble; local minor marble, calc-silicate rocks, amphibolite, and micaceous quartzite; locally migmatitic; local abundant alaskite-aplite-pegmatite pods and dikes or leucocratic tonalite dikes and sills; local unmapped bodies of metatonalite and gabbro. **Jurassic–Permian** schist, gneiss, amphibolite, quartzite, phyllite, greenschist, and marble; pods and layers of serpentinite, metaperidotite, metapyroxenite, and hornblendite. **Triassic–Permian** amphibolite, quartzite (metachert), schist, and rare marble; local discontinuous lenses of metaperidotite and metaconglomerate; mylonitic and (or) phyllonitic in places; locally abundant tonalite dikes and sills; local minor amphibolite and quartzite. *Includes named units:* **NE** part of 7, part of 62, part of 114, part of 159, part of 326, part of 440, part of 477, part of 582, 724, 800, part of 844, 876, and 886; **NW** part of 99, 581, part of 583, 684, and 887; **SW** 460.

pChm **Precambrian heterogeneous metamorphic rocks — Precambrian** amphibolite, gneiss, schist, quartzite, and phyllite; subordinate siltite; minor hornfels; local dikes and irregular masses of alaskite-aplite-pegmatite, granite, and amphibolite; locally migmatitic and locally mylonitic. *Includes named units:* **NE** 116, 275, 341, 509, and 715.

Mzam **Mesozoic amphibolite — Pre-Tertiary** amphibolite with subordinate gneiss and schist; locally protomylonitic, mylonitic, and (or) ultramylonitic. *Includes named units:* **NE** 706 and part of 844.

MzPzam **Mesozoic–Paleozoic amphibolite — Jurassic** amphibolite, schist, and ultramafic rocks, including serpentinite; subordinate metagabbro and metanorite; locally brecciated and cut by abundant basalt(?) and granodiorite dikes; rare eclogite and associated greenschist. **Pre-Jurassic** amphibolite with minor mica schist, metadiorite, metagabbro, and tonalite gneiss. *Consists of named units:* **NE** 17, 34, and 744; **NW** part of 230 and part of 347.

TKgn **Tertiary–Cretaceous gneiss — Tertiary–Cretaceous** schist, paragneiss, gneissose tonalite, tonalite gneiss, amphibole gneiss, and gneissic amphibolite; strongly layered; migmatitic sills and dikes of leucotonalite, granite, and granodiorite; local quartzite, calc-silicate rocks, and marble. *Consists of named units:* **NW** part of 99, part of 100, part of 583, and part of 763.

Mzgn **Mesozoic gneiss — Pre-Tertiary** banded and migmatitic quartzofeldspathic gneiss and schist, hornblende-biotite gneiss and schist, amphibolite, and garnetiferous alaskite gneiss; strongly foliated to schistose to nonfoliated biotite-oligoclase-quartz gneiss; monzonitic and syenitic gneiss; locally mylonitic; local felsic sills and dikes. **Cretaceous** tonalite to granodiorite gneiss; locally migmatite. **Jurassic** schistose amphibolite to medium- and coarse-grained quartz diorite, layered hornblende gneiss, gneissose quartz diorite, and trondhjemite. *Consists of named units:* **NE** part of 829, part of 844, and 862; **NW** 29, part of 48, part of 129, part of 229, part of 586, part of 829, and 926.

Pzgn **Paleozoic gneiss — Pre-Devonian** quartzose pyroxene gneiss and gabbroic to granitic orthogneiss; rare granite and marble; local metaquartz diorite, pyroxenite, greenstone, meta-andesite, and minor ultramafic rocks; local metamorphosed gabbro, diabase, and tonalite. *Consists of named unit:* **NW** part of 960.

TKog **Tertiary–Cretaceous orthogneiss** — **Paleocene** weakly to strongly foliated trondhjemitic biotite orthogneiss; weakly to strongly foliated and lineated leucocratic to mesocratic tonalitic and granodioritic orthogneiss. **Paleocene–Cretaceous** gneissic to mylonitic and locally pegmatitic biotite tonalite. **Tertiary–Cretaceous** heterogeneous tonalite orthogneiss, trondhjemite orthogneiss, granodiorite orthogneiss, and diorite orthogneiss; commonly migmatitic with fine-grained to pegmatitic dikes and sills; subordinate tonalite and granodiorite; local amphibolite, hornblende schist, quartzite, biotite schist, marble, calc-silicate rocks, and ultramafic rocks. *Includes named units:* **NE** 426, part of 621, 762, and 915; **NW** 65, 282, 427, 500, 536, 568, 669, 685, part of 763, 803, and 916.

Mzog **Mesozoic orthogneiss** — **Pre-Tertiary** orthogneiss cut by tonalite dikes and sills; granodioritic and tonalitic orthogneiss with minor alaskite gneiss, pegmatite, and migmatite. **Cretaceous** granodioritic and tonalitic orthogneiss; minor amphibolite; local flaser, schlieren, nonfoliated, cataclastic, mylonitic, and migmatitic textures; minor garnet schist, quartzite, and amphibolite; locally abundant schlieren and dikes of biotite schist, locally riddled by mylonitic shear zones. **Cretaceous–Jurassic** tonalite and granodiorite orthogneiss with locally abundant melanocratic schlieren and inclusions, locally protomylonitic and mylonitic. **Jurassic** tonalitic, granodioritic, quartz dioritic, and quartz monzonitic orthogneiss; partly strongly gneissic and migmatitic and partly directionless to weakly foliated and porphyroblastic; minor amphibolite. **Triassic** tonalite gneiss, quartz diorite gneiss, quartz diorite, granodiorite gneiss, and augen gneiss. **Mesozoic** quartz diorite or granodiorite orthogneiss; local diorite or granite orthogneiss. *Includes named units:* **NE** 11, 12, part of 41, part of 54, part of 114, 177, 178, 196, 277, part of 326, 438, part of 440, part of 464, part of 477, 507, 519, part of 582, 592, 598, part of 606, 607, 620, 695, part of 824, part of 827, part of 844, 859, part of 860, and 949; **NW** 6, part of 41, part of 48, 220, 239, 257, 345, 431, 442, 488, part of 489, part of 583, part of 586, 587, 641, 697, part of 763, 777, part of 821, and 927; **SW** 352 and part of 390.

Mzmi **Mesozoic migmatite and mixed metamorphic and igneous rocks** — **Tertiary and Cretaceous** biotite granite and granodiorite with abundant pendants and inclusions of biotite gneiss; local aplite-pegmatite pods and dikes and biotite diorite dikes. **Cretaceous** schist, gneiss, and amphibolite with concordant to discordant layers, pods, and anastomosing dikes and swirls of directionless tonalite and granodiorite; locally gradational into leucocratic orthogneiss. **Cretaceous–Jurassic** banded biotite-hornblende schist and gneiss, amphibolite, and concordant to discordant layers, pods, and anastomosing dikes and swirls of leucocratic tonalite and granodiorite; or tonalite, quartz diorite, and granodiorite with abundant discontinuous layers, schlieren, and inclusions of gneiss and schist, amphibolite, metagabbro, metadiorite, migmatite, and minor calc-silicate rocks; locally abundant alaskite-aplite-pegmatite dikes and pods, dikes and small bodies of granodiorite and quartz monzonite, and minor agmatite. *Includes named units:* **NE** part of 7, part of 62, part of 114, part of 117, part of 402, part of 606, 672, part of 786, 798, 807, part of 827, 855, 856, and part of 910; **NW** 60 and 209.

Tectonic Zones

tz **Tectonic zones** — Areas of intense cataclasis, including mylonitization. *Includes named units:* **NE** 37 and 872.

REFERENCES CITED

Coates, J. A., 1974, Geology of the Manning Park area, British Columbia: Geological Survey of Canada Bulletin 238, 177 p., 9 plates.

Daly, R. A., 1912, Geology of the North American Cordillera at the forty-ninth parallel: Geological Survey of Canada Memoir 38, Parts 1, 2, and 3, 857 p.

Dragovich, J. D.; Logan, R. L.; Schasse, H. W.; Walsh, T. J.; Lingley, W. S., Jr.; Norman, D. K.; Gerstel, W. J.; Lapen, T. J.; Schuster, J. E.; Meyers, K. D.; 2002, Geologic map of Washington—Northwest quadrant: Washington Division of Geology and Earth Resources Geologic Map GM-50, 3 sheets, scale 1:250,000, with 72 p. text.

Dragovich, J. D.; Norman, D. K.; Anderson, Garth, 2000, Interpreted geologic history of the Sedro-Woolley North and Lyman 7.5-minute quadrangles, western Skagit County, Washington: Washington Division of Geology and Earth Resources Open File Report 2000-1, 71 p., 1 plate.

Dragovich, J. D.; Norman, D. K.; Grisamer, C. L.; Logan, R. L.; Anderson, Garth, 1998, Geologic map and interpreted geologic history of the Bow and Alger 7.5-minute quadrangles, western Skagit County, Washington: Washington Division of Geology and Earth Resources Open File Report 98-5, 80 p., 3 plates.

Dragovich, J. D.; Norman, D. K.; Lapen, T. J.; Anderson, Garth, 1999, Geologic map of the Sedro-Woolley North and Lyman 7.5-minute quadrangles, western Skagit County, Washington: Washington Division of Geology and Earth Resources Open File Report 99-3, 37 p., 4 plates.

Gallagher, M. P.; Brown, E. H.; Walker, N. W., 1988, A new structural and tectonic interpretation of the western part of the Shuksan blueschist terrane, northwestern Washington: Geological Society of America Bulletin, v. 100, no. 9, p. 1415-1422.

Lapen, T. J., 2000, Geologic map of the Bellingham 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 2000-5, 36 p., 2 plates.

Miles, C. E., compiler, 2003, Geologic shaded-relief map of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Map 67, 1 sheet, scale 1:500,000.

Misch, Peter, 1966, Tectonic evolution of the northern Cascades of Washington—A west-cordilleran case history. *In* Canadian Institute of Mining and Metallurgy; and others, A symposium on the tectonic history and mineral deposits of the western Cordillera in British Columbia and neighbouring parts of the United States, Vancouver, 1964: Canadian Institute of Mining and Metallurgy Special Volume 8, p. 101-148, 1 plate.

Schuster, J. E.; Gulick, C. W.; Reidel, S. P.; Fecht, K. R.; Zurenko, Stephanie, 1997, Geologic map of Washington—Southeast quadrant: Washington Division of Geology and Earth Resources Geologic Map GM-45, 2 sheets, scale 1:250,000, with 20 p. text.

Stoffel, K. L.; Joseph, N. L.; Waggoner, S. Z.; Gulick, C. W.; Korosec, M. A.; Bunning, B. B., 1991, Geologic map of Washington—Northeast quadrant: Washington Division of Geology and Earth Resources Geologic Map GM-39, 3 sheets, scale 1:250,000, with 36 p. text.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B., 2002, Geologic map of the Sauk River 30- by 60-minute quadrangle, Washington: U.S. Geological Survey Geologic Investigations Series Map I-2592, 2 sheets, scale 1:100,000, with 67 p. text.

Walsh, T. J.; Korosec, M. A.; Phillips, W. M.; Logan, R. L.; Schasse, H. W., 1987, Geologic map of Washington—Southwest quadrant: Washington Division of Geology and Earth Resources Geologic Map 34, 2 sheets, scale 1:250,000, with 28 p. text.

Whetten, J. T.; Zartman, R. E.; Blakely, R. J.; Jones, D. L., 1980, Allochthonous Jurassic ophiolite in northwest Washington: Geological Society of America Bulletin, v. 91, no. 6, p. I 359-I 368.

Wolfe, E. W.; McKee, E. H., 1972, Sedimentary and igneous rocks of the Grays River quadrangle, Washington: U.S. Geological Survey Bulletin 1335, 70 p.

Table 1. List of map units showing 1:250,000-scale units included in each 1:500,000-scale unit. Units are listed alphabetically.

Unit	Included 1:250,000 units (quadrant where unit occurs)	
Mzam	pTam	Pre-Tertiary amphibolite (NE)
Mzc	Kc$_2$	Cretaceous continental sedimentary rocks (NW)
	Kc$_2$	Upper Cretaceous continental sedimentary rocks (NE)
	Kcg$_1$	Cretaceous conglomerate (NW)
	Kcg$_1$	Lower Cretaceous conglomerate (NE)
	Kcg$_2$	Cretaceous conglomerate (NW)
	Kcg$_2$	Upper Cretaceous conglomerate (NE)
	TKc	Tertiary and Cretaceous continental sedimentary rocks (NE)
Mzgn	Jgn	Jurassic migmatitic gneiss (NW)
	Kbg	Cretaceous banded gneiss (NW)
	pCgn	Precambrian gneiss (NE)
	pTbg	Pre-Tertiary banded gneiss (NE)
	pTgn	Pre-Tertiary gneiss (NE)
	pTgn	Pre-Tertiary gneiss (NW)
Mzhm	Khm	Cretaceous heterogeneous metamorphic rocks (NW)
	KJhmc	Cretaceous to Jurassic heterogeneous chert-bearing metamorphic rocks (NW)
	Mzsc	Mesozoic schist and amphibolite (NW)
	TRhm	Triassic heterogeneous metamorphic rocks (NW)
MzI	Ji	Jurassic intrusive rocks, undivided (NW)
	Jia	Jurassic acidic intrusive rocks (NE)
	Jib	Jurassic basic (mafic) intrusive rocks (NW)
	Jib	Jurassic basic (mafic) intrusive rocks (NE)
	Jigb	Jurassic gabbro (NW)
	Jigd	Jurassic granodiorite (NE)
	Jik	Jurassic alkalic intrusive rocks (NE)
	Jiq	Jurassic quartz diorite (NE)
	Jiq	Upper Jurassic quartz diorite (SW)
	Jiqm	Jurassic quartz monzonite (NE)
	Jit	Jurassic tonalite (NE)
	Jit	Jurassic tonalite (NW)
	Kia	Cretaceous acidic intrusive rocks (NE)
	Kia	Cretaceous acidic intrusive rocks (SE)
	Kiaa	Cretaceous alaskite pegmatite (NW)
	Kiaa	Cretaceous alaskite-aplite-pegmatite (NE)
	Kiat	Cretaceous two-mica granite (NE)
	Kid	Cretaceous diorite (NE)
	Kid	Cretaceous diorite (NW)
	Kida	Cretaceous dacite and andesite (NE)
	Kig	Cretaceous granite (NE)
	Kigb	Cretaceous gabbro (NE)
	Kigb	Cretaceous gabbro (NW)
	Kigd	Cretaceous granodiorite (NE)
	Kigd	Cretaceous granodiorite (NW)
	Kigd	Cretaceous granodiorite (SE)
	Kiq	Cretaceous quartz diorite (NE)
	Kiq	Cretaceous quartz diorite (NW)
	Kiqm	Cretaceous quartz monzonite (NE)
	Kit	Cretaceous tonalite (NE)
	Kit	Cretaceous tonalite (NW)
	Kit	Cretaceous tonalite (SE)
	KJi	Cretaceous to Jurassic intrusive rocks, undivided (SE)
	KJia	Cretaceous and Jurassic acidic intrusive rocks (NE)
	KJid	Cretaceous and Jurassic diorite (NE)
	KJigb	Cretaceous and Jurassic gabbro (NE)
	KJigb	Cretaceous gabbro (NW)
	KJigd	Cretaceous and Jurassic granodiorite (NE)
	KJiq	Cretaceous and Jurassic quartz diorite (NE)
	Mzigb	Mesozoic gabbro (NE)
	pTigb	Pre-Tertiary gabbro (NW)
	pTigd	Pre-Tertiary granodiorite and granite (NW)
	TKid	Tertiary and Cretaceous diorite (NE)
	TRib	Triassic basic (mafic) intrusive rocks (NE)
	TRigd	Triassic granodiorite (NE)
	TRiq	Triassic quartz diorite (NW)
Mzm	Jm	Jurassic marine sedimentary rocks (NE)
	Jm	Jurassic marine sedimentary rocks (NW)
	Jm	Jurassic marine sedimentary rocks (SE)
Mzm	KJm	Cretaceous and Jurassic marine sedimentary rocks (NE)
	KJm	Cretaceous and Jurassic marine sedimentary rocks (SW)
	KJm	Cretaceous to Jurassic marine sedimentary rocks (NW)
	KJmct	Cretaceous and Jurassic chert-rich marine sedimentary rocks (SW)
	Km$_1$	Cretaceous marine sedimentary rocks (NW)
	Km$_1$	Lower Cretaceous marine sedimentary rocks (NE)
	Km$_2$	Upper Cretaceous marine sedimentary rocks (NE)
Mzmi	KJmg	Cretaceous and Jurassic migmatite (NE)
	KJmi	Cretaceous and Jurassic mixed metamorphic and igneous rocks (NE)
	KJmi	Cretaceous to Jurassic mixed metamorphic and igneous rocks (NW)
	Kmg	Cretaceous migmatite (NE)
	TKmi	Tertiary and Cretaceous mixed metamorphic and igneous rocks (includes only that part of unit TKmi located adjacent to the Columbia River in southern Ferry County) (NE)
Mzms	Jar	Jurassic meta-argillite (NW)
	Jcg	Jurassic metaconglomerate (NE)
	Jmm	Jurassic marine metasedimentary rocks (NW)
	Jph	Jurassic phyllite (NW)
	Jph	Jurassic phyllite (SW)
	Jsh	Jurassic greenschist (NW)
	Jsh	Jurassic schist (SW)
	JTRmc	Jurassic to Triassic metachert (NW)
	JTRmm	Jurassic to Triassic marine metasedimentary rocks (NW)
	KJmc	Cretaceous to Jurassic metachert (NW)
	KJmm	Cretaceous to Jurassic marine metasedimentary rocks (NW)
	KJms	Cretaceous to Jurassic metasedimentary rocks (NW)
	Kmcg	Cretaceous metaconglomerate (NW)
	Mzsh	Mesozoic schist (NW)
	pKq	Pre-Cretaceous quartzite (SE)
	pTms	Pre-Tertiary metasedimentary rocks (NW)
	TRcb	Triassic metacarbonate (NE)
	TRcb	Triassic metacarbonate (SE)
	TRmm	Triassic marine metasedimentary rocks (NE)
Mzmt	Jmt	Jurassic metasedimentary and metavolcanic rocks, undivided (NW)
	JTRmt	Jurassic to Triassic metasedimentary and metavolcanic rocks, undivided (NW)
	KJmt	Cretaceous and Jurassic metasedimentary and metavolcanic rocks, undivided (NE)
	Kmt	Cretaceous metasedimentary and metavolcanic rocks, undivided (NW)
	TRmt	Triassic metasedimentary and metavolcanic rocks, undivided (NE)
	TRmt	Triassic metasedimentary and metavolcanic rocks, undivided (SE)
Mzmv	Jmv	Jurassic metavolcanic rocks (NE)
	Jmv	Jurassic metavolcanic rocks (NW)
	Jmvd	Jurassic metavolcanic rocks, dacite (NW)
	JTRmv	Jurassic to Triassic metavolcanic rocks (NW)
	KJmv	Cretaceous and Jurassic metavolcanic rocks (NE)
	KJmv	Cretaceous to Jurassic metavolcanic rocks (NW)
	KJmv	Cretaceous to Jurassic metavolcanic rocks (SW)
	TRmv	Triassic metavolcanic rocks (NE)
Mzn	KJn	Cretaceous to Jurassic nearshore sedimentary rocks (NW)
	Kn	Cretaceous nearshore sedimentary rocks (NW)
	TRn	Triassic nearshore sedimentary rocks (NW)
Mzog	Jog	Jurassic orthogneiss (NE)
	Jog	Jurassic orthogneiss (SW)
	KJog	Cretaceous and Jurassic orthogneiss (NE)
	KJog	Cretaceous to Jurassic orthogneiss (NW)

Unit	Included 1:250,000 units (quadrant where unit occurs)	
Mzog	Kog	Cretaceous orthogneiss (NE)
	Kog	Cretaceous orthogneiss (NW)
	Kogm	Cretaceous mesocratic orthogneiss (NE)
	Mzog	Mesozoic orthogneiss (NE)
	pTog	Pre-Tertiary orthogneiss (NE)
	pTog	Pre-Tertiary orthogneiss (NW)
	TRog	Triassic orthogneiss (NE)
	TRog	Triassic orthogneiss (NW)
MzPzam	Jam	Jurassic amphibolite (NW)
	pJam	Pre-Jurassic amphibolite (NE)
	pJam	Pre-Jurassic amphibolite (SW)
MzPzhm	JPhmc	Jurassic to Permian heterogeneous chert-bearing metamorphic rocks (NW)
	pJhm	Pre-Jurassic heterogeneous metamorphic rocks (NE)
	pJmb	Pre-Jurassic marble (NE)
	pJsc	Pre-Jurassic schist (SW)
	pThm	Pre-Tertiary heterogeneous metamorphic rocks (NE)
	pTmb	Pre-Tertiary marble (NE)
	pTqz	Pre-Tertiary quartzite (NE)
	pTsc	Pre-Tertiary schist (NE)
	TRPhmc	Triassic and Permian heterogeneous chert-bearing metamorphic rocks (NE)
	TRPmb	Triassic and Permian marble (NE)
MzPzmt	JDmt	Jurassic to Devonian metasedimentary and metavolcanic rocks, undivided (NW)
	JMmt	Jurassic to Mississippian metasedimentary and metavolcanic rocks, undivided (NW)
	JPmt	Jurassic to Permian metasedimentary and metavolcanic rocks, undivided (NW)
	pDmt	Pre-Devonian metasedimentary and metavolcanic rocks, undivided (NW)
	pTmt	Pre-Tertiary metasedimentary and metavolcanic rocks, undivided (NW)
	pTmt	Pre-Tertiary metasedimentary and metavolcanic rocks, undivided (SE)
	TRPmt	Triassic and Permian metasedimentary and metavolcanic rocks, undivided (NE)
MzPzu	Ju	Jurassic ultramafic rocks (NW)
	pTu	Pre-Tertiary ultramafic rocks (NW)
	u	Uncertain age ultrabasic (ultramafic) rocks (NE)
Mzv	JPvs	Jurassic to Permian volcanic and sedimentary rocks, undivided (NW)
	Jv	Jurassic volcanic rocks (NW)
	KJv	Cretaceous and Jurassic volcanic rocks, undivided (NE)
	KJvb	Cretaceous to Jurassic basalt flows (SW)
	KJvs	Cretaceous and Jurassic volcanic and sedimentary rocks, undivided (NE)
	KJvs	Cretaceous to Jurassic volcanic and sedimentary rocks, undivided (NW)
	KJvt	Cretaceous and Jurassic tuff (NE)
	Kv$_2$	Cretaceous volcanic rocks (NW)
	Kv$_2$	Upper Cretaceous volcanic rocks, undivided (NE)
	Kvs$_2$	Upper Cretaceous volcanic and sedimentary rocks, undivided (NE)
	PeKvs	Paleocene to Cretaceous sedimentary and volcanic rocks, undivided (NW)
	pTvr	Pre-Tertiary rhyolite (SW)
pChm	pCam	Precambrian amphibolite (NE)
	pCbg	Precambrian banded gneiss (NE)
	pChm	Precambrian heterogeneous metamorphic rocks (NE)
	pCqz	Precambrian quartzite (NE)
	pCsc	Precambrian schist (SE)
pCi	Yib	Proterozoic Y basic (mafic) intrusive rocks (NE)
	Zib	Proterozoic Z basic (mafic) intrusive rocks (NE)
pCms	Yar	Proterozoic Y meta-argillite (NE)
	Yar$_1$	Proterozoic Y Togo Formation (NE)
	Yar$_2$	McHale Slate (NE)
	Ycb	Proterozoic Y metacarbonate (NE)
	Ycb$_1$	Proterozoic Y Edna Dolomite (NE)
pꞒms	Ycb$_2$	Proterozoic Y Stensgar Dolomite (NE)
	Ymm	Proterozoic Y Buffalo Hump Formation (NE)
	Yms$_1$	Proterozoic Y Prichard Formation (NE)
	Yms$_2$	Proterozoic Y Ravalli Group (NE)
	Yms$_2$	Proterozoic Y Ravalli Group, Revett and Burke Formations, undivided (SE)
	Yms$_3$	Proterozoic Y Wallace Formation (NE)
	Yms$_4$	Precambrian Missoula Group, Striped Peak Formation (SE)
	Yms$_4$	Proterozoic Y Striped Peak Formation (Missoula Group) (NE)
	Yq	Proterozoic Y quartzite (NE)
	Zcg	Proterozoic Z metaconglomerate (NE)
	Zmm	Proterozoic Z marine metasedimentary rocks (NE)
	Zq	Proterozoic Z quartzite (NE)
pꞒmv	Zmv	Proterozoic Z metavolcanic rocks (NE)
Pzgn	pDgn	Pre-Devonian gneiss (NW)
PzI	MzPzI	Mesozoic to Paleozoic intrusive rocks (NW)
	Oigb	Ordovician gabbro (NE)
	pDi	Pre-Devonian intrusive rocks (NW)
	ℙI	Pennsylvanian intrusive rocks (NW)
	Pzib	Paleozoic basic (mafic) intrusive rocks (NE)
Pzms	Ꞓcb	Cambrian metacarbonate (NE)
	CDcb	Carboniferous and Devonian metacarbonate (NE)
	CDmm	Carboniferous and Devonian marine metasedimentary rocks (NE)
	Ꞓmm	Cambrian marine metasedimentary rocks (NE)
	COcg	Carboniferous to Ordovician metaconglomerate (NE)
	COmm	Carboniferous to Ordovician marine metasedimentary rocks (NE)
	Dcb	Devonian metacarbonate (NE)
	Dcg	Devonian metaconglomerate (NE)
	Oar	Ordovician meta-argillite (NE)
	Ocb	Ordovician metacarbonate (NE)
	OꞒcb	Ordovician and Cambrian metacarbonate (NE)
	Omm	Ordovician marine metasedimentary rocks (NE)
	Pcb	Permian metacarbonate (NE)
	PDmb	Permian to Devonian limestone and marble (NW)
	PDms	Permian to Devonian metasedimentary rocks (NW)
	Pmm	Permian marine metasedimentary rocks (NE)
	pPsh	Pre-Permian schist (NW)
	Pzmm	Paleozoic marine metasedimentary rocks (NE)
	Smm	Silurian marine metasedimentary rocks (NE)
	TRPmm	Triassic and Permian marine metasedimentary rocks (NE)
Pzmt	CDmt	Carboniferous and Devonian metasedimentary and metavolcanic rocks, undivided (NE)
	PDmt	Permian to Devonian metasedimentary and metavolcanic rocks, undivided (NW)
Pzmv	CDmv	Carboniferous and Devonian metavolcanic rocks (NE)
	COmv	Carboniferous to Ordovician metavolcanic rocks (NE)
	Omv	Ordovician metavolcanic rocks (NE)
	PDmv	Permian to Devonian metavolcanic rocks (NW)
	TRPmv	Triassic and Permian metavolcanic rocks (NE)
	TRPmv	Triassic to Permian metavolcanic rocks (NW)
PzpꞒms	ꞒZq	Cambrian and Proterozoic Z quartzite (NE)
	OYmm	Ordovician to Proterozoic Y marine metasedimentary rocks (NE)
Qa	Qa	Quaternary alluvium (NE)
	Qa	Quaternary alluvium (NW)
	Qa	Quaternary alluvium (SE)
	Qa	Quaternary alluvium (SW)
	Qb	Quaternary beach deposits (NW)
	Qb	Quaternary beach deposits (SW)
	Qc	Pleistocene continental sediments (NW)
	Qc	Pleistocene continental sediments (SW)
	Qguc	Quaternary undifferentiated surficial deposits (NW)
	Qla	Quaternary lacustrine and fluvial deposits (SE)

Unit	Included 1:250,000 units (quadrant where unit occurs)	
Qa	Qla	Quaternary lacustrine deposits (NE)
	Qm	Holocene modified land and fill (*see also* unit Qgd) (NW)
	Qoa	Quaternary older alluvium (NE)
	Qoa	Quaternary older alluvium (NW)
	Qoa	Quaternary older alluvium (SE)
	Qoa	Quaternary older alluvium (SW)
	Qp	Quaternary peat (NE)
	Qp	Quaternary peat deposits (NW)
	Qp	Quaternary peat deposits (SW)
	Qs	Quaternary sediments, undivided (near Lake Chelan [T27–28N, R21–23E]) (*see also* unit Qgd) (NE)
	Qt	Quaternary terraced deposits (SE)
	Qt	Quaternary terraced sediments (SW)
Qad	Qad	Quaternary Late Wisconsinan alpine drift, undivided (NW)
	Qad	Pleistocene drift (NE)
	Qad	Pleistocene, Fraser glaciation and younger, undifferentiated drift (SW)
	Qao	Late Wisconsinan alpine outwash (NW)
	Qao	Pleistocene, Fraser glaciation and younger, outwash deposits (SW)
	Qap	Early Wisconsinan alpine drift (NW)
	Qap	Pleistocene, pre-Fraser glaciation, undifferentiated drift (SW)
	Qapo	Early Wisconsinan alpine outwash (NW)
	Qapo	Pleistocene, pre-Fraser glaciation, outwash deposits (SW)
	Qapw$_1$	Older pre-Wisconsinan alpine drift (NW)
	Qapw$_2$	Younger pre-Wisconsinan alpine drift (NW)
Qd	Qd	Holocene dune sand (NW)
	Qd	Holocene dune sand (SW)
	Qd	Quaternary dune sand (NE)
	Qd	Quaternary dune sand (SE)
Qf	Qf$_b$	Quaternary Bonneville flood deposits (SE)
	Qfg	Quaternary outburst flood deposits, gravel (NE)
	Qfg	Quaternary outburst flood deposits, gravel (SE)
	Qfg	Upper Pleistocene flood gravel (SW)
	Qfs	Quaternary outburst flood deposits, silt and sand (NE)
	Qfs	Quaternary outburst flood deposits, silt and sand (SE)
	Qfs	Upper Pleistocene flood sand and silt (SW)
	Qgl	Late Wisconsinan glaciolacustrine deposits (NE)
	Qgl	Quaternary glaciolacustrine deposits (NW)
	Qglf	Late Wisconsinan glaciolacustrine and outburst flood deposits, undivided (NE)
Qgd	Qga	Quaternary continental advance glacial outwash (NW)
	Qga	Quaternary continental advance glacial outwash (SW)
	Qgd	Quaternary continental glacial drift (NE)
	Qgd	Quaternary undifferentiated continental glacial drift (NW)
	Qgd	Quaternary undifferentiated continental glacial drift (SW)
	Qgdm	Quaternary continental glaciomarine drift (NW)
	Qgd$_s$	Quaternary undifferentiated continental glacial drift, Sumas Stade of the Fraser Glaciation (NW)
	Qgo	Quaternary continental glacial outwash (NE)
	Qgo	Quaternary undifferentiated continental glacial outwash (NW)
	Qgo	Quaternary undifferentiated continental glacial outwash deposits (SW)
	Qgog	Quaternary continental glacial outwash gravel (NW)
	Qgog	Quaternary continental glacial outwash gravel (SW)
	Qgos	Quaternary continental glacial outwash sand (NW)
	Qgos	Quaternary continental glacial outwash sand (SW)
	Qgp	Quaternary continental glacial till (NE)
	Qgp	Quaternary undifferentiated continental glacial drift (SW)

Unit	Included 1:250,000 units (quadrant where unit occurs)	
Qgd	Qgp	Quaternary undifferentiated continental glacial drift of pre-Fraser age (NW)
	Qgpc	Quaternary continental glacial deposits of pre-Fraser age, undifferentiated (NW)
	Qgt	Quaternary continental glacial till (NE)
	Qgt	Quaternary continental glacial till (NW)
	Qgt	Quaternary continental glacial till (SW)
	Qml	Holocene modified land and fill (*see also* unit Qa) (NW)
	Qs	Quaternary sediments, undivided (deposits in the Methow Valley) (*see also* unit Qa) (NE)
Qi	Qian	Quaternary intrusive andesite (SW)
	Qida	Quaternary intrusive dacite (SW)
Ql	Ql	Quaternary loess (NE)
	Ql	Quaternary loess (NW)
	Ql	Quaternary loess (SE)
	Ql	Quaternary loess (SW)
Qls	ⱣM̶ls	Pliocene and Miocene mass-wasting deposits (NE)
	Qls	Quaternary landslide debris (SW)
	Qls	Quaternary landslide deposits (NW)
	Qls	Quaternary mass-wasting deposits (NE)
	Qls	Quaternary mass-wasting deposits (SE)
	QⱣls	Quaternary to Pliocene mass-wasting deposits (SE)
QTc	QM̶cg	Quaternary to Miocene continental sedimentary rocks, conglomerate (SE)
	QⱣc	Pleistocene to Pliocene continental sediments (SW)
	QⱣcg	Quaternary to Pliocene continental sedimentary rocks, conglomerate (SE)
QTi	QⱣian	Pleistocene to Pliocene intrusive andesite (SW)
	QⱣida	Pleistocene to Pliocene intrusive dacite (SW)
QTv	QⱣva	Pleistocene to Pliocene andesite flows (SW)
	QⱣvb	Pleistocene to Pliocene basalt flows (SW)
Qv	QⱣvd	Pleistocene to Pliocene dacite flows (SW)
	Qva	Quaternary andesite flows (NW)
	Qva	Quaternary andesite flows (SW)
	Qvb	Quaternary basalt flows (NW)
	Qvb	Quaternary basalt flows (SW)
	Qvd	Pleistocene dacite flows (SW)
	Qvd	Quaternary dacite flows (NW)
	Qvr	Quaternary rhyodacite to dacite (NW)
Qvt	Qvc	Quaternary volcaniclastic deposits, undivided (SW)
	Qvl	Quaternary lahars (NW)
	Qvl	Quaternary lahars (SW)
	Qvp	Holocene pyroclastic flows (SW)
	Qvp	Quaternary pyroclastic deposits (NW)
	Qvt	Quaternary tuff (NW)
Tc	Ec	Eocene continental sedimentary rocks (NW)
	Ec$_1$	Continental sedimentary rocks (NE)
	Ec$_1$	Eocene continental sedimentary rocks (SE)
	Ec$_1$	Lower to middle Eocene continental sedimentary rocks (SW)
	Ec$_1$	Lower to middle Eocene continental sedimentary rocks (NW)
	Ec$_2$	Middle and upper Eocene continental sedimentary rocks (NE)
	Ec$_2$	Middle to upper Eocene continental sedimentary rocks (SW)
	Ec$_2$	Middle to upper Eocene continental sedimentary rocks (NW)
	Ecg$_1$	Lower and middle Eocene conglomerate (NE)
	Ecg$_1$	Lower to middle Eocene conglomerate and sandstone (NW)
	Ecg$_2$	Middle and upper Eocene conglomerate (NE)
	Ecg$_2$	Middle to upper Eocene conglomerate and sandstone (NW)
	M̶c	Miocene continental sedimentary rocks (NE)
	M̶c	Miocene continental sedimentary rocks (NW)
	M̶c	Miocene continental sedimentary rocks (SE)
	M̶c	Miocene continental sedimentary rocks (SW)
	M̶c$_2$	Miocene continental sedimentary rocks (NW)

Unit	Included 1:250,000 units (quadrant where unit occurs)	
Tc	M̵cg	Miocene continental sedimentary rocks, conglomerate (SE)
	M̵cg	Miocene continental sedimentary rocks, conglomerate (SW)
	Φc	Oligocene continental sedimentary rocks (NE)
	ΦEc	Oligocene to Eocene continental sedimentary rocks (NW)
	Ᵽc	Pliocene continental sediments (SW)
	Ᵽcg	Pliocene continental sedimentary rocks, conglomerate (SE)
	ᵽM̵a	Pliocene to Miocene alluvium (SE)
	ᵽM̵c	Pliocene to Miocene continental sedimentary rocks (SE)
	ᵽM̵cg	Pliocene and Miocene conglomerate (NE)
	ᵽM̵cg	Pliocene to Miocene continental sedimentary rocks, conglomerate (SE)
	QᵽCg	Pleistocene and Pliocene conglomerate (now known to be Pliocene to Miocene) (NE)
Ti	Ei	Eocene dikes, undivided (NW)
	Ei	Eocene intrusive rocks, undivided (NE)
	Eia	Eocene acidic intrusive rocks (NE)
	Eian	Eocene andesite (NE)
	Eian	Eocene andesite (NW)
	Eiat	Eocene two-mica granite (NE)
	Eib	Eocene basic (mafic) intrusive rocks (NW)
	Eib	Eocene basic (mafic) intrusive rocks (SW)
	Eib	Eocene basic (mafic) intrusive rocks NE
	Eid	Eocene diorite (NE)
	Eida	Eocene dacite and andesite (NE)
	Eida	Eocene intrusive dacite (SW)
	Eig	Eocene granite (NE)
	Eig	Eocene granite (NW)
	Eigb	Eocene gabbro (NW)
	Eigd	Eocene granodiorite (NE)
	Eigd	Eocene granodiorite (NW)
	Eik	Eocene alkalic intrusive rocks (NE)
	Eimd	Eocene monzodiorite (NE)
	Eiq	Eocene quartz diorite (NE)
	Eiq	Eocene quartz diorite (NW)
	Eiqm	Eocene quartz monzonite (NE)
	Eiqm	Eocene quartz monzonite (SW)
	Eir	Eocene rhyolite (NE)
	Eir	Eocene rhyolite (NW)
	Eis	Eocene syenite (NE)
	Eit	Eocene tonalite (NW)
	Eitr	Eocene trachyte (NE)
	M̵ia	Miocene acidic intrusive rocks (SW)
	M̵ian	Miocene andesite (NW)
	M̵ian	Miocene andesite NE
	M̵ian	Miocene intrusive andesite (SW)
	M̵ib	Miocene basic (mafic) intrusive rocks (SW)
	M̵id	Miocene diorite (SW)
	M̵ida	Miocene dacite (NW)
	M̵ida	Miocene intrusive dacite (SW)
	M̵ig	Miocene granite (NW)
	M̵ig	Miocene granite (SW)
	M̵igb	Miocene gabbro (NW)
	M̵igb	Miocene gabbro (SW)
	M̵igd	Miocene granodiorite (NW)
	M̵igd	Miocene granodiorite (SW)
	M̵iq	Miocene quartz diorite (SW)
	M̵iqm	Miocene quartz monzonite (NW)
	M̵iqm	Miocene quartz monzonite (SW)
	M̵ir	Miocene intrusive rhyolite (SW)
	M̵it	Miocene tonalite (NW)
	M̵iv	Miocene intrusive-volcanic complex (SW)
	M̵ix	Miocene intrusive breccia (NW)
	M̵Φian	Miocene to Oligocene andesite (NW)
	M̵Φian	Miocene to Oligocene intrusive andesite (SW)
	M̵Φib	Miocene to Oligocene basic (mafic) intrusive rocks (SW)
	M̵Φid	Miocene to Oligocene diorite (SW)
	M̵Φida	Miocene to Oligocene intrusive dacite (SW)
	M̵Φig	Miocene to Oligocene granite (NW)
Ti	M̵Φigb	Miocene to Oligocene gabbro (NW)
	M̵Φigd	Miocene to Oligocene granodiorite (NW)
	M̵Φit	Miocene to Oligocene tonalite (NW)
	M̵Φiv	Miocene to Oligocene intrusive-volcanic complex (SW)
	M̵Φix	Miocene to Oligocene breccia (NW)
	ΦEian	Oligocene to Eocene pyroxene andesite (NW)
	ΦEida	Oligocene to Eocene dacite (NW)
	Φian	Oligocene andesite (NE)
	Φian	Oligocene andesite (NW)
	Φib	Oligocene basic (mafic) intrusive rocks (NW)
	Φig	Oligocene granite (NW)
	Φigd	Oligocene granodiorite (NW)
	Φii	Oligocene intermediate intrusive rocks (NW)
	Φiq	Oligocene quartz diorite (NW)
	Φir	Oligocene rhyolite (NW)
	Φit	Oligocene tonalite (NW)
	Ꝑit	Paleocene tonalite (NE)
	Ꝑit	Paleocene tonalite (NW)
	Ᵽian	Pliocene intrusive andesite (SW)
	Ᵽida	Pliocene dacite (NW)
	Ᵽida	Pliocene intrusive dacite (SW)
	Ᵽig	Pliocene granite (NW)
	Ᵽigd	Pliocene granodiorite (NW)
	Ᵽiq	Pliocene quartz diorite (NW)
	Ᵽiq	Pliocene quartz diorite (SW)
	Ᵽiqm	Pliocene quartz monzonite (NW)
	ᵽM̵ida	Pliocene to Miocene dacite (NW)
TKgn	TKbg	Tertiary to Cretaceous banded gneiss (NW)
TKi	TKia	Tertiary and Cretaceous acidic intrusive rocks (NE)
	TKiaa	Tertiary and Cretaceous alaskite-aplite-pegmatite (NE)
	TKiat	Tertiary and Cretaceous two-mica granite (NE)
	TKig	Tertiary and Cretaceous granite (NE)
	TKig	Tertiary to Cretaceous granite pegmatite (NW)
	TKigd	Tertiary and Cretaceous granodiorite (NE)
	TKit	Tertiary and Cretaceous tonalite (NE)
	TKi	Tertiary to Cretaceous intrusive rocks (NW)
TKog	ꝐKog	Paleocene to Cretaceous orthogneiss (NW)
	Ꝑog	Paleocene orthogneiss (NE)
	Ꝑog	Paleocene orthogneiss (NW)
	TKmi	Tertiary and Cretaceous mixed metamorphic and igneous rocks (includes only that part of unit TKmi located to the north of Lake Chelan in Chelan and Okanogan Counties) (NE)
	TKog	Tertiary to Cretaceous orthogneiss (NW)
Tm	Em	Eocene marine sedimentary rocks (NW)
	Em$_1$	Lower? to middle Eocene marine sedimentary rocks (SW)
	Em$_1$	Lower to middle Eocene marine sedimentary rocks (NW)
	Em$_2$	Middle to upper Eocene marine sedimentary rocks (SW)
	Em$_2$	Middle to upper Eocene marine sedimentary rocks (NW)
	EꝐm	Eocene to Paleocene marine sedimentary rocks (NW)
	M̵Ebx	Miocene to Eocene breccia (NW)
	M̵Em	Miocene to Eocene marine sedimentary rocks (NW)
	M̵Emst	Miocene to Eocene marine thick-bedded sedimentary rocks (NW)
	M̵m	Miocene marine sedimentary rocks (NW)
	M̵m$_1$	Lower to middle Miocene marine sedimentary rocks (SW)
	M̵m$_1$	Lower to middle Miocene marine sedimentary rocks (NW)
	M̵m$_2$	Middle to upper Miocene marine sedimentary rocks (SW)
	M̵m$_2$	Middle to upper Miocene marine sedimentary rocks (NW)
	M̵mst	Miocene marine thick-bedded sedimentary rocks (NW)

Unit	Included 1:250,000 units (quadrant where unit occurs)	
Tm	M̶Φm	Miocene to Oligocene marine sedimentary rocks (NW)
	ΦEm	Oligocene to upper Eocene marine sedimentary rocks (SW)
	ΦEm	Oligocene to Eocene marine sedimentary rocks (NW)
	ΦEmst	Oligocene to Eocene marine thick-bedded sedimentary rocks (NW)
Tn	En	Middle to upper Eocene nearshore sedimentary rocks (SW)
	M̶n	Lower Miocene nearshore sedimentary rocks (NW)
	ΦEn	Oligocene to upper Eocene nearshore sedimentary rocks (SW)
	ΦEn	Oligocene to upper Eocene nearshore sedimentary rocks (NW)
	ꝐM̶n	Pliocene to Miocene nearshore sedimentary rocks (NW)
Tv	Ev	Eocene volcanic rocks (NW)
	Ev	Eocene volcanic rocks, undivided (SW)
	Ev_1	Lower and middle Eocene volcanic rocks, undivided (NE)
	Ev_2	Middle and upper Eocene volcanic rocks, undivided (NE)
	Eva	Eocene andesite (NW)
	Eva	Eocene andesite flows (SW)
	Evb	Eocene basalt (NW)
	Evb	Eocene basalt flows (SW)
	Evd	Eocene dacite (NW)
	Evd_1	Lower and middle Eocene dacite and andesite flows (NE)
	Evd_2	Middle and upper Eocene dacite and andesite flows (NE)
	Evr	Eocene rhyolite (NW)
	Evr	Eocene rhyolite flows (SW)
	M̶Φv	Miocene to Oligocene volcanic rocks (SW)
	M̶Φva	Miocene to Oligocene andesite flows (NW)
	M̶Φva	Miocene to Oligocene andesite flows (SW)
	M̶va	Miocene andesite (NW)
	M̶va	Miocene andesite flows (SW)
	M̶vb	Miocene basalt flows (SW)
	M̶vd	Miocene dacite flows (SW)
	M̶vr	Miocene rhyolite (SW)
	ΦEva	Lower Oligocene to upper Eocene andesite flows (SW)
	ΦEva	Oligocene to Eocene andesite (NW)
	ΦEvb	Oligocene to Eocene basalt (NW)
	Φva	Oligocene andesite flows (SW)
	Φvb	Oligocene basalt flows (SW)
	Φvd	Oligocene dacite (NW)
	Φvd	Oligocene dacite flows (SW)
	Φvr	Oligocene rhyolite (NW)
	Φvr	Oligocene rhyolite flows (SW)
	Ꝑv	Pliocene volcanic rocks (NW)
	Ꝑvb	Pliocene basalt flows (SW)
	Ꝑvd	Pliocene dacite flows (SW)
	Ꝑvr	Pliocene rhyolite (SW)
Tv_{cr}	M̶v_g	Middle Miocene Grande Ronde Basalt (NW)
	M̶v_g	Middle Miocene Grande Ronde Basalt (SW)
	M̶v_g	Miocene Grande Ronde Basalt (NE)
	M̶v_g	Miocene Grande Ronde Basalt (SE)
	M̶v_i	Miocene Imnaha Basalt (SE)
	M̶vi_g	Middle Miocene Grande Ronde Basalt invasive flows (NW)
	M̶vi_g	Middle Miocene Grande Ronde Basalt, invasive flows (SW)
	M̶vi_g	Miocene Grande Ronde Basalt, invasive (SE)
	M̶vi_g	Miocene Grande Ronde Basalt, invasive flows (NE)
	M̶vi_s	Middle Miocene Saddle Mountains Basalt, invasive flows (SW)
	M̶v_s	Middle to upper Miocene Saddle Mountains Basalt (SW)
	M̶v_s	Miocene Saddle Mountains Basalt (NE)
	M̶v_s	Miocene Saddle Mountains Basalt (SE)

Unit	Included 1:250,000 units (quadrant where unit occurs)	
Tv_{cr}	M̶v_w	Middle Miocene Wanapum Basalt (SW)
	M̶v_w	Miocene Wanapum Basalt (NE)
	M̶v_w	Miocene Wanapum Basalt (SE)
Tv_c	Ev_c	Lower to middle Eocene Crescent Formation (SW)
	Ev_c	Lower to middle Eocene Crescent Formation (NW)
Tvt	Evc	Eocene volcaniclastic rocks (NW)
	Evc	Eocene volcaniclastic rocks (SW)
	Evc_1	Lower and middle Eocene volcaniclastic rocks (NE)
	Evc_2	Middle and upper Eocene volcaniclastic rocks (NE)
	Evt	Eocene tuff (NW)
	Evt	Eocene tuff (SW)
	Evt_1	Lower and middle Eocene tuff (NE)
	Evt_2	Middle and upper Eocene tuff (NE)
	M̶Φvc	Miocene to Oligocene volcaniclastic rocks (SW)
	M̶Φvt	Miocene to Oligocene tuff (NW)
	M̶Φvt	Miocene to Oligocene tuff (SW)
	M̶vc	Miocene volcaniclastic rocks (NW)
	M̶vc	Miocene volcaniclastic rocks (SW)
	M̶vc_2	Miocene volcaniclastic rocks (NW)
	M̶vt	Miocene tuff (NW)
	M̶vt	Miocene tuff (SW)
	ΦEvc	Lower Oligocen to upper Eocene volcaniclastic rocks (SW)
	ΦEvt	Oligocene to upper Eocene tuff (SW)
	Φvc	Oligocene volcaniclastic rocks (NW)
	Φvc	Oligocene volcaniclastic rocks (SW)
	Φvt	Oligocene tuff (NW)
	Φvt	Oligocene tuff (SW)
	Φvx	Oligocene volcanic breccia (NW)
	Ꝑvt	Pliocene tuff (SW)
	Ꝑvx	Pliocene volcanic breccia (NW)
tz	tz	Tectonic zone (NE)
	tz	Tectonic zone (SW)

Table 2. List of Named Units. The reader is referred to the 1:250,000-scale quadrant geologic maps for defining and representative references for named units and for more information on geographic locations of named units. The number of each named unit included in a map unit on this map is given at the end of each map unit description. By looking those numbers up in this table, the reader can determine which named units are included in each map unit. The column headed ‘1:500,000’ gives the symbol or symbols for named units on this map. The column headed ‘1:250,000’ gives the symbol or symbols for named units on the 1:250,000-scale geologic quadrant maps.

The 1:250,000-scale quadrant geologic map on which each named unit is located is listed after the name of the unit in the ‘Geologic Unit’ column; NE is Stoffel and others (1991), NW is Dragovich and others (2002), SE is Schuster and others (1997), and SW is Walsh and others (1987).

In a unit name, an uppercase ‘Formation’ or lithologic term denotes a formal name; for example, Addy Quartzite and Aldwell Formation. Lowercase ‘formation’ or lithologic term denotes an informal name; for example, Hanford formation, Alder Creek stock, and orthogneiss of Alma Creek.

No.	Geologic unit	1:500,000	1:250,000
1	Addy Quartzite (NE)	PzpЄms	ЄZq
2	Aeneas Creek pluton (NE)	Mzl	Kia Kid
3	Alder Creek stock (NE)	Mzl	KJiq
4	Alderton Formation (SW)	Qa	Qc
5	Aldwell Formation (NW)	Tm Tv	Em$_2$ Evb
6	Alma Creek, orthogneiss of (NW)	Mzog	Kog
7	Alta Lake, amphibolite, schist, and gneiss of (NE)	MzPzhm Mzmi	pJhm KJmg
8	Amboy drift (SW)	Qad	Qap Qapo
9	Anarchist Group (NE)	Pzms	Pmm Pcb Pzmm
10	Anderson Creek pluton (NE)	Mzl	KJigd
11	Anglin, orthogneiss of (NE)	Mzog	pTog
12	Antoine Creek, hornblende tonalite gneiss of (NE)	Mzog	Mzog
13	Arbuckle Mountain pluton (NE)	Tki	TKit
14	Arlington Gravel Member, Vashon Drift (NW)	Qgd	Qgog
15	Armstrong Canyon, unit, N$_2$ Grande Ronde Basalt (SE)	Tv$_{cr}$	M̶v$_g$
16	Armstrong Mountain, granite west of (NE)	TKi	TKig
17	Ashnola Gabbro (NE)	MzPzam	pJam
18	Asotin Creek gravel (SE)	QTc	QM̶cg
19	Asotin Member of the Saddle Mountains Basalt (SE) (SW)	Tv$_{cr}$	M̶v$_s$
19	Asotin Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	M̶v$_s$
20	Astoria Formation (NW)	Tm	M̶m$_1$
20	Astoria Formation (SW)	Tm	M̶m$_1$
21	Baada Point Member, Makah Formation. *See* Makah Formation. (NW)		
22	Baekos Creek assemblage, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvl
23	Bahobohosh, sandstone of (NW)	Tm	Em$_2$
24	Baker Lake, blueschist of, Bell Pass mélange (NW)	MzPzmt	JPmt
25	Baker River phase, Chilliwack composite batholith, Index family (NW)	Ti	Φigd
26	Balch Lake, basalt porphyry of (SW)	QTv	QP̶vb
27	Bald Mountain pluton (NW)	Mzl	pTigd
28	Bald Mountain, conglomerate of (NW)	Mzms	pTms
29	Baring Migmatites (NW)	Mzgn	Jgn

No.	Geologic unit	1:500,000	1:250,000
30	Barlow Pass Volcanics (NW)	Tc Tv Ti	Ec$_2$ Eigb Ev Evr
31	Barnaby Creek, granodiorite of (NE)	Mɀl	KJia
32	Barstow granodiorite (NE)	Ti	Eigd
33	Basalt Peak, porphyritic dacite of (NW)	Ti	Eir
34	Basic complex (NE)	Mɀ₽am	pJam
35	Basin City, basalt of, Ice Harbor Member (SE)	Tv$_{cr}$	M̶v$_s$
36	Bastile Ridge, andesite of, andesite of Mount Baker (NW)	Qv	Qva
37	Battle Mountain gneiss (NE)	tz	tz
38	Bear Creek flow, Umatilla Member (SE)	Tv$_{cr}$	M̶v$_s$
39	Bear Creek, siltstone and sandstone of (NW)	Tm	Em$_1$
40	Bear Mountain, granite of western, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	M̶ig
41	Bearcat Ridge plutons (NE)	Mɀog	Kog
41	Bearcat Ridge plutons (NW)	Mɀog	Kog
42	Beaver Creek, basalt of (NE)	Tv$_{cr}$	M̶v$_g$
43	Beckler Peak stocks, Mount Stuart batholith (NW)	Mɀl	Kigd
44	Bee Flat, andesite of (SW)	QTv	Q₽va
45	Bell Pass mélange, undivided (NW)	Mɀ₽mt Mɀ₽u	pTmt pTu
45	Bell Pass mélange. Includes and listed under: Elbow Lake Formation, Yellow Aster Complex, Vedder complex, blueschist of Baker Lake, Twin Sisters Dunite, and metaconglomerate of Sumas Mountain. (NW)		
46	Bellingham Bay Member, Chuckanut Formation. *See* Chuckanut Formation. (NW)		
47	Belt Supergroup (NE)	pЄms	Yms$_4$ Yms$_3$ Yms$_2$ Yms$_1$
47	Belt Supergroup (SE)	pЄms	Yms$_4$ Yms$_2$
48	Bench Lake, tonalitic gneiss of (NW)	Mɀog Mɀgn	Kog Kbg
49	Bethel Ridge, olivine basalt of (SW)	Tv	₽vb
50	Beverly Member, Ellensburg Formation (SE)	Tc	M̶c
51	Big Bosom Buttes, volcanic rocks of (NW)	Tvt	Φvx Φvt
52	Billy Goat Mountain, volcanics of (NE)	Mɀv	KJv
53	Black Buttes, andesite of, andesite of Mount Baker (NW)	Qv Qvt	Qva Qvp
54	Black Peak batholith (NE)	Mɀog	Kog
54	Black Peak batholith, undivided. Also includes Reynolds Peak phase, listed separately. (NW)	Mɀl	Kit
55	Blakeley Formation (NW)	Tm Tn	ΦEm ΦEn
56	Blakely Harbor Formation (NW)	Tc	M̶c$_2$
57	Blickensderfer Quartz Monzonite (NE)	Mɀl	Kiat
58	Blue Goat pluton (NE)	Mɀl	Jigd
59	Blue Mountain unit (NW)	Tm	E₽m
60	Bob Creek, tonalite of (NW)	Mɀmi	KJmi
61	Bonneville flood deposits (SE)	Qf	Qfb
62	Boot Mountain, plutonic complex of (NE)	Mɀmi Mɀ₽hm	KJmi pJhm

No.	Geologic unit	1:500,000	1:250,000
63	Boring Lava (SW)	QTv	QP̶va QP̶vb
64	Bottle Spring pluton (NE)	Mzl	Kia
65	Boulder Creek, orthogneiss of, Skagit Gneiss Complex (NW)	TKog	TKog
66	Boundary Creek, tuff of (NW)	Tvt	Φvt
67	Bowers quartz diorite (NE)	Mzl	KJiq KJigd
68	Brays Landing, conglomerate of (NE)	Tc	P̶M̶cg
69	Bridge Creek intrusions (NE)	Ti	Eig Eiqm
70	Bridge Creek, ultramafic and mafic rocks near (NE)	MzPzu	u
71	Brownes Creek, siltstone of (NW)	Tm	Em_1
72	Buck Creek pluton (NW)	Mzl	Kigd
73	Buck Mountain Formation (NE)	Mzv	KJv KJvs KJvt
74	Buckhorn Mountain pluton (NE)	Mzl	KJigd
75	Buckhorn Springs unit, R_1 Grande Ronde Basalt (SE)	Tv_{cr}	$M̶v_g$
76	Buffalo Hump Formation (NE)	pЄms	Ymm
77	Buford Member, Saddle Mountains Basalt, Columbia River Basalt Group (SE)	Tv_{cr}	$M̶v_s$
78	Bullfrog Mountain Formation (NE)	Pzms	Pmm
79	Bulson Creek, rocks of (NW)	Tc Tn	ΦEc ΦEn
80	Bumping Lake pluton (SW)	Ti	M̶ia
81	Bumping River tuff (SW)	Tvt	M̶Φvt
82	Burch Mountain, andesite and dacite of (NE)	Ti	M̶ian
83	Burke Formation (NE)	pЄms	Yms_2
83	Burke Formation, Ravalli Group (SE)	pЄms	Yms_2
84	Burnt Mountain, tuff of (SW)	Tvt	M̶Φvt
85	Burroughs Mountain Drift (SW)	Qad	Qad
86	Butte Camp dome (SW)	Qi	Qida
87	Button Creek stock (NE)	Mzl	Jit
88	Cady Ridge, volcanic rocks of (NW)	Ti	P̶M̶ida
89	Camas Land, diabase of (NW)	Ti	Eigb
90	Cape Foulweather Basalt (SW)	Tv_{cr}	$M̶v_w$
91	Carbon River stock (SW)	Ti	M̶igd
92	Carbonado Formation (SW)	Tc	Ec_2
93	Cardinal Peak pluton (NE)	Mzl	Kit
93	Cardinal Peak pluton (NW)	Mzl	Kiq Kit
94	Carlton stocks (NE)	Mzl	KJiq
95	Carpenters Creek Tuff Member, Makah Formation. *See* Makah Formation. (NW)		
96	Carter Mountain, dacite of (NE)	Tv Tvt Tc	Evd_1 Evt_1 Ec_1
97	Cascade Pass dike, Cascade Pass family (NW)	Ti	M̶ix M̶it

No.	Geologic unit	1:500,000	1:250,000
98	Cascade Pass family. Includes and listed under: granite of western Bear Mountain, Cascade Pass dike, Chilliwack composite batholith undivided, Cloudy Pass batholith, Cool Glacier stock, granite of Depot Creek, Downey Mountain stock, granite porphyry of Egg Lake, quartz diorite and quartz monzodiorite of Icy Peak, Lake Ann stock, Mineral Mountain pluton, Mount Buckindy pluton, quartz monzonite and granite of Nooksack Cirque, quartz monzodiorite of Redoubt Creek, Ruth Creek pluton, granite of Ruth Mountain, tonalite of Silver Creek, and stock on Sitkum Creek. (NW)		
99	Cascade River Schist of Misch (1966). *See also* Napeequa Schist. (NW)	MzPzhm TKgn Mzhm	JPhmc TKbg Ŧhm
100	Cascade River Schist of Tabor and others (2002) (redefined), undivided. *See also* Napeequa Schist. (NW)	TKgn Mzhm	TKbg Ŧhm
101	Cascade River Schist of Tabor and others (2002) (redefined). Includes: Spider Mountain Schist, listed separately. (NW)		
102	Castle Peak stock (NW)	Ti	Eigd
103	Cathedral batholith (NE)	Mzl	Kia
104	Cave Basalt (SW)	Qv	Qvb
105	Cave Mountain Formation, basaltic metavolcanic member of the (NE)	Mzmv	Ŧmv
106	Cave Mountain Formation, dark gray metalimestone member of the (NE)	Mzms	Ŧcb
107	Cave Mountain Formation, metadolomite and metalimestone member of the (NE)	Mzms	Ŧcb
108	Cave Mountain Formation, metasiltstone member of the (NE)	Mzms	Ŧmm
109	Cave Mountain Formation, slate and metalimestone member of the (NE)	Mzms	Ŧmm
110	Cedar District Formation, Nanaimo Group (NW)	Mzn	Kn
111	Center Creek unit, R_1 Grande Ronde Basalt (SE)	Tv_{cr}	$Ɱv_g$
112	Chambers Creek, beds of (SW)	Tc	Ec_2
113	Chaval pluton (NW)	Mzhm Mzl	Khm Kiq
114	Chelan complex (NE)	Mzmi Mzog Mzl MzPzhm	Kmg Kog Kogm Kigb ŦPhmc ŦPmb
115	Chelan Complex. *See* Entiat pluton. (NW)		
116	Chester Creek, gneiss near (NE)	p€hm	p€hm
117	Chewack River gneiss complex (NE)	Mzl Mzmi	Kit, KJmi
118	Chikamin Creek, volcanic rocks of (NW)	Tv Tvt	Φvr Φvt
119	Chilliwack composite batholith of the Cascade Pass family. Includes and listed under: granite of western Bear Mountain, granite of Depot Creek, granite porphyry of Egg Lake, quartz diorite and quartz monzodiorite of Icy Peak, Lake Ann stock, Mineral Mountain pluton, quartz monzonite and granite of Nooksack Cirque, quartz monzodiorite of Redoubt Creek, Ruth Creek pluton, and granite of Ruth Mountain. (NW)		
120	Chilliwack composite batholith of the Index family. Includes and listed under: Baker River phase, gabbro of Copper Lake, diorite of Ensawkwatch Creek, tonalite of Maiden Lake, biotite alaskite of Mount Blum, granodiorite of Mount Despair, Pocket Peak phase, Price Glacier pluton, and Silesia Creek pluton. (NW)		
121	Chilliwack composite batholith of the Snoqualmie family. Includes and listed under: Chilliwack valley phase, Indian Mountain phase, biotite granodiorite of Little Beaver Creek, Mount Sefrit gabbronorite, and Perry Creek phase. (NW)		
122	Chilliwack composite batholith, undivided, Cascade Pass family (NW)	Ti	Ɱig Ɱiqm
123	Chilliwack composite batholith, undivided, Index family (NW)	Ti	Φib
124	Chilliwack Group and Cultus Formation, undivided (NW)	MzPzmt	JDmt
125	Chilliwack Group, undivided (NW)	Pzmt Pzms Pzmv	PDmt PDmb PDms PDmv
126	Chilliwack Group. Includes and listed under: sedimentary rocks of Mount Herman and volcanic rocks of Mount Herman. (NW)		
127	Chilliwack valley phase, Chilliwack composite batholith, Snoqualmie family (NW)	Ti	Φit
128	China Creek unit, N_1 Grande Ronde Basalt (SE)	Tv_{cr}	$Ɱv_g$

No.	Geologic unit	1:500,000	1:250,000
129	Chiwaukum Schist (NW)	Mzhm Mzgn	Mzsc Kbg
130	Chiwawa River, basaltic plugs and dikes of (NW)	Ti	Eib
131	Chocolate Creek assemblage, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvl
132	Chopaka intrusive complex (NE)	Mzl MzPzu	Ŧib u
133	Chow Chow drift (NW)	Qad	Qad Qao Qap Qapo
133	Chow Chow drift (SW)	Qad	Qao
134	Chuckanut Formation (NW)	Tc	Ec
135	Chuckanut Formation. Includes: Bellingham Bay Member, Coal Mountain unit, Governor's Point Member, Maple Falls Member, Padden Member, Slide Member, and Warnick Member. (NW)		
136	Chumstick Formation. Includes the Nahahum Canyon Member, not listed separately. (NW)	Tc Tv	Ec$_{2}$ Ecg$_{2}$ Evb
137	Chumstick Formation (NE)	Tc	Ec$_{2}$ Ecg$_{2}$
138	Clallam Formation (NW)	Tn	M̶n
139	Clark Mountain pluton (NW)	Mzl	Kit
140	Clarkston gravel (SE)	Tc	M̶cg
141	Clarkston Heights gravel (SE)	QTc	QM̶cg
142	Clear West complex (SW)	Ti	M̶ir
143	Clearwater gravel (SE)	QTc	QM̶cg
144	Cliff Point, siltstone of (SW)	Tm	Em$_{2}$
145	Cloudy Pass batholith, Cascade Pass family (NW)	Ti	M̶ian M̶ida M̶ig M̶igd M̶it M̶ix
146	Cloverland, basalt of, Weissenfels Ridge Member (SE)	Tv$_{cr}$	M̶v$_{s}$
147	Coal Mountain unit, Chuckanut Formation. *See* Chuckanut Formation. (NW)		
148	Cody Lake, hypabyssal intrusive suite of (NE)	Ti	Eida
149	Cold Creek interbed, Ellensburg Formation (SE)	Tc	M̶c
150	Coleman Pinnacle, andesite of, andesite of Mount Baker (NW)	Qv	Qva
151	Columbia River Basalt Group (NE)	Tv$_{cr}$	M̶v$_{s}$ M̶v$_{w}$ M̶v$_{g}$ M̶vi$_{g}$
152	Columbia River Basalt Group (SE)	Tv$_{cr}$	M̶v$_{s}$ M̶v$_{w}$ M̶v$_{g}$ M̶vi$_{g}$ M̶vi
153	Columbia River Basalt Group (SW)	Tv$_{cr}$	M̶v$_{s}$ M̶v$_{w}$ M̶v$_{g}$ M̶vi$_{s}$ M̶vi$_{g}$
154	Colville batholith (NE)	TKi Mzl Ti	TKia TKig TKiat TKiaa TKid TKigd Eiqm Eimd Eid Eigd Eig
155	Colvos Sand (SW)	Qgd	Qga
156	Colvos Sand Member, Vashon Drift (NW)	Qgd	Qga
157	Comox Formation, Nanaimo Group (NW)	Mzn	Kn
158	Conconully pluton (NE)	Mzl	Kigd
159	Conconully, metamorphic complex of (NE)	Mzms MzPzhm	Ŧmm pJhm pJmb
160	Conglomerate Point, intrusive breccia of (NW)	Ti	M̶ix
161	Constitution Formation (NW)	Mzms	KJmm

No.	Geologic unit	1:500,000	1:250,000
162	Cook Lake, porphyritic granite and granodiorite of (NE)	Mzl	Kia
163	Cool Glacier stock, Cascade Pass family (NW)	Ti	Rigd
164	Cool stock, Cascade Pass family. *See* Cool Glacier stock. (NW)		
165	Coon Hollow Formation (SE)	Mzm	Jm
166	Cooper Mountain batholith (NE)	Ti	Eigd Eiqm
167	Cooper Pass, volcaniclastic rocks of (NW)	Tvt	M̶vc
168	Copper Lake, gabbro of, Chilliwack composite batholith, Index family (NW)	Ti	Φib
169	Copper Peak pluton (NW)	Ti	Eit
170	Coryell intrusive rocks (NE)	Ti	Eis
171	Cougar Divide, andesite of, andesite of Mount Baker (NW)	Qv	Qva
172	Council Bluff, lava flows of (SW)	Tv	M̶va
173	Covada Group (NE)	Pzms Pzmv	Omm Ocb Omv
174	Cow Creek, strata of, Virginian Ridge Formation, Pasayten Group (NW)	Mzc	Kc_2
175	Cowlitz Formation (SW)	Tm Tn Tvt	Em_2 En Evt
176	Coyote Creek pluton (NE)	TKi	TKig TKiaa
177	Coyote Ridge quartz dioritic gneiss (NE)	Mzog	KJog
178	Crawfish Lake tonalite gneiss (NE)	Mzog	pTog
179	Crescent Formation (NW)	Tv Tv_c Tm Ti Tvt	Ev_c Em_1 Eib Eigb Evr Evt
180	Crescent Formation (SW)	Tm Tv_c	Em_1 Ev_c
181	Crook Mountain, schist of (NW)	Mzms	Mzsh
182	Cultus Formation (NW)	Mzms Mzmv	JTrmm JTrmv
183	Cultus Formation and Chilliwack Group, undivided (NW)	MzPzmt	JDmt
184	Cyclone Lake pluton (NW)	Mzl	Kigd
185	Daisy Trail, granite of (NE)	TKi	TKig
186	Dalles Formation (SW)	Tc	M̶c
187	Damon silt (SW)	Qa	Qc
188	Darling Lake gabbro (NE)	Mzl	Mzigb
189	Darrington Phyllite, Easton Metamorphic Suite (NW)	Mzms	Jph
190	De Roux unit (NW)	Mzms	Jar
191	Dead Duck pluton, Grotto batholith, Snoqualmie family (NW)	Ti	M̶Φigd
192	Deadhorse Creek, granite of (NE)	Ti	Eig
193	Deadman Bay Volcanics (NW)	MzPzmt	TrPmv
194	Deer Peak, metavolcanic unit of (NW)	Mzmv	Jmv
195	Deer Trail Group (NE)	p€ms	Ymm Ycb_2 Yar_2 Ycb_1 Yar_1
196	Deerhorn Creek, schist near (NE)	Mzog	pTog
197	Deming Sand (NW)	Qgd	Qgdm
198	Depoe Bay Basalt (SW)	Tv_{cr}	$M̶v_g$ $M̶vi_g$

No.	Geologic unit	1:500,000	1:250,000
199	Depot Creek, granite of, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	M̶ig
200	Devils Elbow pluton (NE)	Ti	Eimd Eid
201	Devils Elbow suite (NE)	Ti	Eimd
202	Devils Horns rhyolite (SW)	Tv	Ꝑvr
203	Devils Pass Member, Virginian Ridge Formation, Pasayten Group (NW)	Mzc	Kcg_2
204	Devils Washbasin basalt (SW)	Tv	Ꝑvb
205	Dewdney Creek Formation (NW)	Mzm	Jm
206	Dirtyface pluton (NW)	Mzl	Kit
207	Disappointment Peak, dacite of, volcanic rocks and deposits of Glacier Peak (NW)	Qv	Qvd
208	Dodge, basalt of, Eckler Mountain Member (SE)	Tv_{cr}	$M̶v_w$
209	Doe Mountain, tonalite of, Remmel batholith (NW)	Mzmi	KJmi
210	Donkey Creek drift (NW)	Qad	$Qapw_1$
211	Double Bluff Drift (NW)	Qgd Qa	Qgpc Qguc
212	Downey Creek pluton (NW)	Mzl	Kigd
213	Downey Creek, sill complex of. *See* Downey Creek pluton. (NW)		
214	Downey Gulch unit, N_1 Grande Ronde Basalt (SE)	Tv_{cr}	$M̶v_g$
215	Downey Mountain stock, Cascade Pass family (NW)	Ti	M̶it
216	Doyle Creek Formation (SE)	Mzmt	TRmt
217	Dtokoah Point Member, Makah Formation. *See* Makah Formation. (NW)		
218	Dubious Creek, granodiorite of (NE)	Mzl	Kiat
219	Duffy Creek, invasive flow of (NE)	Tv_{cr}	$M̶vi_g$
220	Dumbell Mountain pluton (NW)	Mzog	TRog
221	Duncan Hill pluton (NE)	Ti	Eigd Eig
221	Duncan Hill pluton (NW)	Ti	Eiq
222	Dunn Mountain pluton (NE)	Mzl	KJigd
223	Dusty Creek assemblage, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvl
224	Eagle Creek Formation (SW)	Tc	M̶cg
225	Eagle Gorge, volcanic rocks of (NW)	Tv	M̶Φva
225	Eagle Gorge, volcanic rocks of (SW)	Tv Tvt	M̶va M̶vt
226	Eagle tuff (NW)	Tvt	M̶Φvt
227	Early Winters Creek, stock south of (NW)	Mzl	Kigd
228	East Sound Group (NW)	Pzmt	PDmt
229	Eastern mélange belt, undivided. Includes volcanic rocks of Whitehorse Mountain, listed separately. (NW)	Mzms Mzgn Mzl Mzmt	Jar Jgn Jib Jigb Jit JTRmc JTRmt
230	Easton Metamorphic Suite, undivided (NW)	MzPzam Mzmv Mzl MzPzu	Jam Jmv Jigb Ju
231	Easton Metamorphic Suite. Includes and listed under: Darrington Phyllite, semischist and phyllite of Mount Josephine, and Shuksan Greenschist. Greenstones (units Jmv and Jigb) and ultramafic rocks (unit Ju) north of the Skagit River (T36N R3–5E) are correlated with the Easton Metamorphic Suite by Gallagher and others (1988) and Lapen (2000) and with the Helena–Haystack mélange by Whetten and others (1980) and Dragovich and others (1998, 1999, 2000). (NW)		
232	Easton Schist (SW)	Mzms	Jph Jsh

No.	Geologic unit	1:500,000	1:250,000
233	Easy Pass, rocks of (NW)	Mzms Mzmt	Kmcg Kmt
234	Eckler Mountain Member, Wanapum Basalt (SE)	Tv$_{cr}$	M̶v$_{w}$
235	Edna Dolomite (NE)	pꞒms	Ycb$_{1}$
236	Edwards Slough diorite (NE)	Mzl	KJigd
237	Egg Lake, granite porphyry of, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	Ᵽig
238	Elbow Lake Formation, Bell Pass mélange (NW)	MzᵽRmt	JPmt pTmt
239	Eldorado Orthogneiss (NW)	Mzog	Kog
240	Electron Mudflow (SW)	Qvt	Qvl
241	Elephant Mountain flow, Elephant Mountain Member (SE)	Tv$_{cr}$	M̶v$_{s}$
242	Elephant Mountain Member of the Saddle Mountains Basalt (SW)	Tv$_{cr}$	M̶v$_{s}$
242	Elephant Mountain Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	M̶v$_{s}$
243	Elijah Ridge Schist (NW)	Mzmt Mzms	Kmt Mzsh
244	Ellemeham Formation (NE)	Mzmv Mzms	Jmv Jcg
245	Ellensburg Formation (NE)	Tc	M̶c
245	Ellensburg Formation (NW)	Tc	M̶c
245	Ellensburg Formation (SE)	Tc	M̶c M̶cg
245	Ellensburg Formation (SW)	Tc Tvt	M̶c M̶vc
246	Elwha lithic assemblage (NW)	Tm Tv	ΦEm ΦEmst ΦEvb
247	Empire Lakes pluton (NE)	Ti	Eiqm
248	Ensawkwatch Creek, diorite of, Chilliwack composite batholith, Index family (NW)	Ti	Φib
249	Entiat pluton (NE)	Mzl	Kit Kigb
250	Entiat pluton, Chelan Complex (NW)	Mzl	Kiaa Kit Kid
251	Esmeralda Peaks diabase, Ingalls Tectonic Complex (NW)	Mzl	Jib
252	Esperance Sand Member, Vashon Drift (NW)	Qgd	Qga
253	Esquatzel Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	M̶v$_{s}$
254	Evans Creek Drift (NW)	Qad	Qad Qao
254	Evans Creek Drift (SW)	Qad	Qad Qao
255	Evans Lake pluton (NE)	Mzl	Kia
256	Everson Glaciomarine Drift (NW)	Qgd Qa	Qgd Qgd Qgo Qguc
257	Excelsior Mountain, gneissic tonalite of (NW)	Mzog	Kog
258	Extension Formation, Nanaimo Group (NW)	Mzn	Kn
259	Falls Creek unit, Makah Formation. *See* Makah Formation. (NW)		
260	Fan Lake Granodiorite (NE)	Mzl	Kia
261	Fancher Field, gravel of (NE)	Qf	Qfg
262	Fawn Peak stock (NE)	Mzl	Kid
263	Felix Creek, granite of (NE)	Mzl	Kig
264	Fidalgo Complex (NW)	Mzl MzᵽRu Mzv Mzm	Ji Jigb Ju Jv KJm KJvs

No.	Geologic unit	1:500,000	1:250,000
265	Fields Spring unit, N_2 Grande Ronde Basalt (SE)	Tv_{cr}	$₥v_g$
266	Fifes Peak Formation (NW)	Tv Tvt	₥va ₥vt
266	Fifes Peak Formation (SW)	Tv	₥va
267	Fifteenmile Creek pluton (NE)	TKi	TKia
268	Fire Mountain pluton (NE)	Ti	Eiqm Eig
269	Flagstaff Mountain sequence (NE)	Pzms Pzmv Pzmt Mzms	CDmm CDmv CDmt Ŧmm Ŧcb
270	Flowery Trail Granodiorite (NE)	Mzl	Ŧigd
271	Foam Creek stock (NW)	Mzl	Kigd
272	Fortune Creek, stock near (NW)	Mzl	Kit
273	Fourth Creek gabbro, Ingalls Tectonic Complex (NW)	Mzl	Jib
274	Frazer Creek complex (NE)	Mzl	KJiq KJigb
275	Freeman, quartzite near (NE)	pЄhm	pЄqz
276	Freezeout Creek, strata of, Harts Pass Formation, Three Fools Creek sequence (NW)	Mzm	Km_1
277	French Valley, gneissic granodiorite of (NE)	Mzog	pTog
278	Frenchman Springs Member of the Wanapum Basalt (NE)	Tv_{cr}	$₥v_w$
278	Frenchman Springs Member of the Wanapum Basalt (SW)	Tv_{cr}	$₥v_w$
278	Frenchman Springs Member, Wanapum Basalt (SE)	Tv_{cr}	$₥v_w$
279	Friedlander Meadows pluton (NE)	Ti	Eimd
280	Frost Mountain, basalt of (SW)	Tv	Evb
281	Fuller Mountain plug (NW)	Ti	Eigd
282	Gabriel Peak, orthogneiss of (NW)	TKog	ꝐKog
283	Galena Point Granodiorite (NE)	Mzl	Kia
284	Gamma Ridge, volcanic rocks of (NW)	Tv	Ꝑv
285	Garda Drift (SW)	Qad	Qad
286	Garfield Mountain, volcanic rocks on (NW)	Tv	Ꝋvd
287	Garrison Schist (NW)	Pzms	pPsh
288	George Creek, granite of (NE)	TKi	TKia
289	Gerome andesite (NE)	Tv Tvt	Evd_1 Evt_1
290	Ginkgo, basalt of, Frenchman Springs Member (SE)	Tv_{cr}	$₥v_w$
291	Glacier Peak tephra, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvp
292	Glacier Peak, volcanic rocks and deposits of, undivided (NW)	Qv	Qvd
293	Glacier Peak, volcanic rocks and deposits of. Includes and listed under: Baekos Creek assemblage, Chocolate Creek assemblage, dacite of Disappointment Peak, Dusty Creek assemblage, Glacier Peak tephra, Kennedy Creek assemblage, Suiattle fill, White Chuck assemblage, White Chuck cinder cone, White Chuck fill, and White Chuck tuff. (NW)		
294	Gleason Mountain, monzogranite of (NE)	Mzl	Kiat
295	Goat Creek Formation (NE)	Mzm	Km_1
296	Goat Island terrane (NW)	Mzms Mzmv	KJms KJmv
297	Goat Mountain plug (SW)	QTi	QꝐida
298	Goat Mountain porphyry (NE)	Ti	Eida

No.	Geologic unit	1:500,000	1:250,000
299	Goat Wall unit, undivided, Pasayten Group (NW)	Mzc	Kc$_2$
300	Goat Wall unit, volcanic rocks of, Pasayten Group (NW)	Mzv	Kv$_2$
301	Goat Wall unit. Includes and listed under: volcanic rocks of Goat Wall unit and Ventura Member of the Midnight Peak Formation. (NW)		
302	Goble Volcanics (SW)	Tv Tvt	ΦEva ΦEvc
303	Goble Volcanics Member of the Cowlitz Formation (SW)	Tv	Evb
304	Goblin Peak stock, Index batholith, Index family (NW)	Ti	Φigd
305	Golden Horn batholith (NW)	Ti	Eig
306	Goose Island, basalt of, Ice Harbor Member (SE)	Tv$_{cr}$	M̶v$_s$
307	Governor's Point Member, Chuckanut Formation. *See* Chuckanut Formation. (NW)		
308	Grand Valley lithic assemblage (NW)	Tm	M̶Em M̶Emst
309	Grande Ronde Basalt (NE)	Tv$_{cr}$	M̶v$_g$ M̶vi$_g$
309	Grande Ronde Basalt (SW)	Tv$_{cr}$	M̶v$_g$ M̶vi$_g$
309	Grande Ronde Basalt, Columbia River Basalt Group (SE)	Tv$_{cr}$	M̶v$_g$ M̶vi$_g$
309	Grande Ronde Basalt, undivided (NW)	Tv$_{cr}$	M̶v$_g$
310	Grande Ronde Basalt. Includes and listed under: invasive flow of Howard Creek. (NW)		
311	Grande Ronde River gravel (SE)	QTc	QM̶cg
312	Granite Falls stock and associated plutons (NW)	Ti	Eigd
313	Granite Pass, monzogranite of (NE)	Mzl	Kiat
314	Granite Point, granodiorite of (SE)	Mzl	Kigd
315	Grant Lake, intrusive complex north of (NE)	Ti	Ei
316	Grass Mountain sequence (NE)	Pzms	CDmm CDcb
317	Grassy Point stock (NW)	Mzl	Kit
318	Grays River volcanic rocks (SW)	Tv	Evb
319	Greenwater lahar (SW)	Qvt	Qvl
320	Grisdale drifts (NW)	Qad	Qad Qao Qap
321	Gross Mountain, dacite dome of (SW)	QTi	QP̶ida
322	Grotto batholith, Snoqualmie family. Includes and listed under: Dead Duck pluton, Monte Cristo stock, and granite of San Juan Creek. (NW)		
323	Grotto batholith, undivided, Snoqualmie family (NW)	Ti	M̶Φig M̶Φigb M̶Φit
324	Grouse Creek unit, R$_2$ Grande Ronde Basalt (SE)	Tv$_{cr}$	M̶v$_g$
325	Gypsy Quartzite (NE)	Pzp₵ms	₵Zq
326	Hall Creek, paragneiss and orthogneiss of (NE)	Mzog MzPzhm	pTog pThm
327	Hall Mountain, granodiorite of (NE)	Mzl	Kiat
328	Hammer Bluff Formation (NW)	Tc	M̶c
329	Hammond, invasive flow of (NE)	Tv$_{cr}$	M̶vi$_g$
330	Hanford formation (SE)	Qf	Qfs Qfg
331	Hannegan Volcanics (NW)	Tv Tvt	P̶v P̶vx
332	Hanson Lake, rhyolite of (NW)	Tv	Evr
333	Harding Mountain, tonalite of, Mount Stuart batholith (NW)	Mzl	Kit

No.	Geologic unit	1:500,000	1:250,000
334	Haro Formation (NW)	Mzn	Ŧn
335	Harts Pass Formation (NE)	Mzm	Km_1
336	Harts Pass Formation, conglomerate of, Three Fools Creek sequence (NW)	Mzc	Kcg_1
337	Harts Pass Formation, Three Fools Creek sequence. Includes and listed under: strata of Freezeout Creek and conglomerate of Harts Pass Formation. (NW)		
338	Harts Pass Formation, undivided, Three Fools Creek sequence (NW)	Mzm	Km_1
339	Haslam Formation, Nanaimo Group (NW)	Mzn	Kn
340	Hatchet Mountain Formation (SW)	Tv Tvt	ΦEva ΦEvc
341	Hauser Lake Gneiss (NE)	pЄhm	pЄbg
342	Hawkins Formation, Ingalls Tectonic Complex (NW)	MzI	Jib
343	Hayden Creek Drift (SW)	Qad	Qap Qapo
344	Haystack Creek leucotrondhjemitic orthogneiss. *See* Haystack Creek, orthogneiss of. (NW)		
345	Haystack Creek, orthogneiss of (NW)	Mzog	Kog
346	Haystack terrane. *See* Helena–Haystack mélange. Greenstones (units Jmv and Jigb) and ultramafic rocks (unit Ju) north of the Skagit River (T36N R3–5E) are correlated with the Easton Metamorphic Suite by Gallagher and others (1988) and Lapen (2000) and with the Helena–Haystack mélange by Whetten and others (1980) and Dragovich and others (1998, 1999, 2000). (NW)		
347	Helena–Haystack mélange (NW)	MzⱣam Mzmt MzI Mzms Mzmv MzⱣu	Jam Jmt Jigb Jit Jmm Jmv Ju
348	Helm Creek drift (SW)	Qgd	Qgp
349	Henry Creek diorite (NE)	Ti	Eimd
350	Herron Creek intrusion (NE)	Ti	Eiqm
351	Herron Creek suite (NE)	Ti	Eiqm Eig
352	Hicks Butte, tonalite gneiss of (SW)	Mzog	Jog
353	Hidden Lake stock (NW)	MzI	Kigd
354	High Pass pluton (NW)	MzI	Kigd
355	Hobuck Lake, sedimentary and basaltic rocks of (NW)	Tv Tvt	Evb Evc
356	Hodgson Creek monzonite (NE)	Ti	Eiqm
357	Hogback Mountain, mafic rocks of (SW)	QTv	QⱣvb
358	Hoh Assemblage (SW)	Tm	Em_1
359	Hoh lithic assemblage. *See* Hoh rock assemblage. (NW)		
360	Hoh Oxbow drift (NW)	Qad	Qad Qao
361	Hoh rock assemblage (NW)	Tm	M̶Em M̶Emst M̶Ebx M̶m M̶mst ΦEm ΦEmst
362	Hoko River Formation, lower Twin River Group (NW)	Tm	Em_2
363	Holden area, younger gneissic rocks of the (NW)	Mzhm	Ŧhm
364	Holden Lake pluton (NW)	Ti	Eit
365	Holden, hornblende biotite tonalite near (NW)	Ti	Eit
366	Holden, biotite granodiorite and granite near (NW)	Ti	Eigd
367	Horse Lake Mountain, hornblende andesite porphyry complex of (NE)	Ti	Φian
368	Horseshoe Mountain pluton (NE)	MzI	Kiqm

No.	Geologic unit	1:500,000	1:250,000
369	Howard Creek, invasive flow of (NE)	Tv$_{cr}$	M̶vi$_g$
370	Howard Creek, invasive flow of, Grande Ronde Basalt (NW)	Tv$_{cr}$	M̶vi$_g$
371	Howson andesite (NW)	Tv	M̶va
372	Hozomeen Group (NW)	Mzv	JPvs
373	Hozomeen stock (NW)	Ti	M̶Φit
374	Huckleberry Formation (NE)	pꞒmv pꞒms	Zmv Zcg
375	Huckleberry Formation, conglomerate member of the (NE)	pꞒms	Zcg
376	Huckleberry Formation, greenstone member of the (NE)	pꞒmv	Zmv
377	Huckleberry Mountain, volcanic rocks of (SW)	Tvt	Φvc
378	Humptulips drift (NW)	Qad	Qapw$_2$
378	Humptulips drift (SW)	Qad	Qap Qapo
379	Humptulips Formation (NW)	Tm	Em$_2$
379	Humptulips Formation (SW)	Tm	Em$_2$
380	Hungry Mountain stock (NE)	Ti	Eiq
381	Hungry Mountain, monzogranite of (NE)	Mzl	Kiat
382	Huntingdon Formation (NW)	Tc	ΦEc
383	Huntzinger, basalt of, Asotin Member (SE)	Tv$_{cr}$	M̶v$_s$
384	Ice Harbor Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	M̶v$_s$
385	Icy Peak, quartz diorite and quartz monzodiorite of, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	R̶iq
386	Imnaha Basalt, Columbia River Basalt Group (SE)	Tv$_{cr}$	M̶vi
387	Index batholith, undivided, Index family (NW)	Ti	Φigd
388	Index batholith. Includes and listed under: Goblin Peak stock, Sunday Creek stock, and metaporphyry on Troublesome Mountain. (NW)		
389	Index family. Includes and listed under: Baker River phase, biotite alaskite of Mount Blum, Chilliwack composite batholith undivided, gabbro of Copper Lake, diorite of Ensawkwatch Creek, Goblin Peak stock, Index batholith undivided, tonalite of Maiden Lake, granodiorite of Mount Despair, Pocket Peak phase, Price Glacier pluton, Sauk ring dike, Shake Creek stock, Silesia Creek pluton, Squire Creek stock, Sunday Creek stock, and metaporphyry on Troublesome Mountain. (NW)		
390	Indian Creek complex (SW)	Mzl Mzog	Jiq Jog
391	Indian Mountain phase, Chilliwack composite batholith, Snoqualmie family (NW)	Ti	Φigd
392	Ingalls Tectonic Complex, undivided (NW)	Mzms Mzhm Mzl Mzmv MzR̶u	Jar KJhmc Jib Jmv Ju
393	Ingalls Tectonic Complex. Includes and listed under: Esmeralda Peaks diabase, Fourth Creek gabbro, Hawkins Formation, and Peshastin Formation. (NW)		
394	Isabella Ridge, andesite of (NE)	Mzv	KJv
395	Isabella Ridge, andesite of. *See* Lookout Mountain unit of the Newby Group. (NW)		
396	Island Mountain, volcanics of (NE)	Tv Tc Ti	Evd$_1$ Ev$_1$ Ec$_1$ Eida Eian
397	Jack Mountain Phyllite (NW)	Mzms MzR̶u	Mzsh pTu
398	Jackita Ridge unit, Three Fools Creek sequence. Includes and listed under: strata of Majestic Mountain and conglomeratic strata of Two Buttes Creek. (NW)		
399	Jackita Ridge unit, undivided, Three Fools Creek sequence (NW)	Mzm	Km$_1$
400	Jansen Creek Member, Makah Formation. *See* Makah Formation. (NW)		

No.	Geologic unit	1:500,000	1:250,000
401	Joe Moses Creek, granodiorite of (NE)	Ti	Eigd
402	Johnny George, plutonic complex of (NE)	TKi Mzmi	TKia TKmi
403	Jordan Lakes pluton (NW)	Mzl	Kigd
404	Kalama River dome (SW)	Qi	Qida
405	Kaniksu batholith (NE)	Mzl	Kia Kig Kigd Kiat Kiaa
406	Keane Ranch, basalt of (NE)	Tv$_{cr}$	M̶v$_{g}$
407	Keechelus Andesitic Series (NW)	Tv Ti	ΦEva ΦEian
408	Keller Butte suite (NE)	TKi Mzl	TKia TKig TKigd TKiat TKiaa TKid
409	Keller Butte, porphyritic granite of (NE)	TKi	TKig
410	Kelly Hill phyllite (NE)	Pzms	CDmm
411	Kennedy Creek assemblage, volcanic rocks and deposits of Glacier Peak. Includes Dusty Creek and Baekos Creek assemblages, also listed separately. (NW)	Qvt	Qvl
412	Kettle Crest pluton (NE)	Ti	Eimd
413	Kitsap Formation (SW)	Qa	Qc
414	Kittitas Drift (NW)	Qad	Qap Qapo
414	Kittitas Drift (SW)	Qad Qa	Qap Qapo Qt
415	Klachopis Point Member, Makah Formation. *See* Makah Formation. (NW)		
416	Klondike Mountain Formation (NE)	Tv Tvt	Evd$_{2}$ Ev$_{2}$ Evt$_{2}$ Evc$_{2}$
417	Klondike Mountain Formation, basalt member of the (NE)	Tv	Evd$_{2}$
418	Klondike Mountain Formation, middle member of the (NE)	Tvt	Evc$_{2}$
419	Klondike Mountain Formation, Tom Thumb Tuff member of the (NE)	Tvt	Evc$_{2}$
420	Kobau Formation (NE)	Mzmt	Ŧrmt
421	Kruger alkaline body (NE)	Mzl	Jik
422	Kulshan caldera, rocks of, undivided. Includes ignimbrite of Swift Creek, listed separately. (NW)	Qv Qvt	Qvr Qvt
423	Kyes Peak, breccia of (NW)	Tvt	M̶vc
424	Ladner Group. *See* Dewdney Creek Formation. (NW)		
425	Lake Ann stock, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	Rigd
426	Lake Juanita leucogneiss (NE)	TKog	Rog
427	Lake Juanita, leucogneiss of, Skagit Gneiss Complex (NW)	TKog	TKog
428	Lake Keechelus tuff member, Ohanapecosh Formation (NW)	Tvt	Φvt
429	Lake Shannon, basalt of (NW)	Qv	Qvb
430	Lakedale Drift (NW)	Qad	Qao Qad
430	Lakedale Drift (SW)	Qad Qa	Qad Qao Qt
431	Lamb Butte, trondhjemite of (NW)	Mzog	KJog
432	Lane Mountain pluton (NE)	Mzl	Jia
433	Larch Lakes pluton (NW)	Ti	Eigd
434	Lasiocarpa Ridge, andesite of, andesite of Mount Baker (NW)	Qv	Qva

No.	Geologic unit	1:500,000	1:250,000
435	Latah Formation (NE)	Tc	M̶c
435	Latah Formation (SE)	Tc	M̶c
436	Lava Divide, andesite of, andesite of Mount Baker (NW)	Qv	Qva
437	Leader Lake quartz monzonite (NE)	Mzl	Kiqm
438	Leader Mountain granodioritic gneiss (NE)	Mzog	KJog Mzog
439	Ledbetter Slate (NE)	Pzms	Oar
440	Leecher Metamorphics (NE)	MzPzhm Mzog	pJhm Mzog
441	Leola Volcanics (NE)	p₵mv	Zmv
442	Leroy Creek pluton (NW)	Mzog	Kog
443	Levey interbed, Ellensburg Formation (SE)	Tc	M̶c
444	Lewiston Orchards, basalt of, Weissenfels Ridge Member (SE)	Tv$_{cr}$	M̶v$_{s}$
445	Lightning Creek stocks (NW)	Mzl	Kid
446	Lily Creek Formation (SW)	Qvt	Qvl
447	Lime Hill, sediments of (SE)	Tc	M̶cg
448	Lincoln Creek Formation (NW)	Tm	ΦEm
448	Lincoln Creek Formation (SW)	Tm	ΦEm
449	Lincoln Plateau, basalt of (SW)	QTv	QP̶vb
450	Little Beaver Creek, biotite granodiorite of, Chilliwack composite batholith, Snoqualmie family (NW)	Ti	Φigd
451	Little Jack unit (NW)	Mzms MzPzu	Mzsh pTu
452	Little Moses Mountain, diorite of (NE)	Ti	Eid
453	Little Roundtop pluton (NE)	Mzl	Kig
454	Lizard Lake, basaltic sandstone and conglomerate of (NW)	Tm	Em$_{1}$
455	Logan Hill Formation (SW)	Qad	Qapo
456	Lolo, basalt of, Priest Rapids Member (SE)	Tv$_{cr}$	M̶v$_{w}$
457	Lone Frank pluton (NE)	Mzl	Kiq
458	Long Alec Creek pluton (NE)	Ti	Eiqm Eig
459	Lookout Creek sandstone (SW)	Tc	Ec$_{2}$
460	Lookout Mountain Formation (SW)	MzPzhm	pJsc
461	Lookout Mountain Ranch Drift (SW)	Qad	Qap
462	Lookout Mountain unit, Newby Group (NW)	Mzmv	Jmv
463	Loomis pluton (NE)	Mzl	Ŧigd
464	Loon Lake granite (NE)	Mzl Mzog TKi Ti	Kia Kig Kigd Kiat Kiaa Kog TKia TKiaa Eia Eiqm Eimd Jia
465	Lopez structural complex (NW)	Mzms Mzmv	KJmm KJmv
466	Lost Peak stock (NE)	Ti	Eigd
467	Lost Peak stock (NW)	Mzl	Kigd
468	Lower Monumental Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	M̶v$_{s}$

No.	Geologic unit	1:500,000	1:250,000
469	Lummi Formation (NW)	Mzmt Mzms	Jmt KJmm
470	Lyall Ridge, porphyries and breccias of (NW)	Ti	M̶ix
471	Lyman lahar (NW)	Qvt	Qvl
472	Lyman Rapids drift (NW)	Qad	Qap
473	Lyman Rapids outwash (NW)	Qad	Qapo
474	Lyons Ferry, basalt of, Frenchman Springs Member (SE)	Tv_{cr}	$M̶v_{w}$
475	Lyre Formation (NW)	Tm Tv Tvt	Em_{2} Em Eva Evt
476	Mabton member, Ellensburg Formation (SE)	Tc	M̶c
477	Mad River terrane, heterogeneous schist and gneiss of the (NE)	MzPzhm Mzog	ŦPhmc ŦPmb Kog
478	Magic Mountain Gneiss (NW)	Mzl	Ŧiq
479	Maiden Lake, tonalite of, Chilliwack composite batholith, Index family (NW)	Ti	Φit
480	Maitlen Phyllite (NE)	Pzms	Ꞓmm Ꞓcb
481	Majestic Mountain, strata of, Jackita Ridge unit, Three Fools Creek sequence (NW)	Mzm	Km_{1}
482	Makah Formation, middle Twin River Group. Includes: Baada Point Member, Carpenters Creek Tuff Member, Dtokoah Point Member, Falls Creek unit, Jansen Creek Member, Klachopis Point Member, and Third Beach Member. (NW)		
483	Makah Formation, undivided, middle Twin River Group (NW)	Tm	ΦEm
484	Manastash Formation (SW)	Tc	Ec_{1}
485	Manila Creek, porphyritic granodiorite of (NE)	TKi	TKia
486	Mann Butte, rhyolite of (SW)	Ti	M̶ir
487	Maple Falls Member, Chuckanut Formation. *See* Chuckanut Formation. (NW)		
488	Marble Creek Orthogneiss, Skagit Gneiss Complex (NW)	Mzog	Kog
489	Marblemount pluton. Includes the Marblemount Meta-Quartz Diorite, not listed separately. (NW)	Mzl Mzog	Ŧiq Ŧog
490	Marrowstone Shale (NW)	Tm	ΦEm
491	Martin Bridge Limestone (SE)	Mzms	Ŧcb
492	Martindale, basalt of, Ice Harbor Member (SE)	Tv_{cr}	$M̶v_{s}$
493	Marysville Sand Member, Vashon Drift (NW)	Qgd	Qgos
494	Mashel Formation (SW)	Tc	M̶c
495	McClure Mountain unit (NE)	Mzmt	KJmt
496	McCoy Creek quartz diorite (SW)	Ti	M̶iq
497	McDonald Ridge drift (SW)	Qad	Qad
498	McFarland Creek stock (NE)	Mzl	Kid
499	McGinnis Lake, garnet-bearing granite of (NE)	TKi	TKiaa
500	McGregor Mountain, migmatitic orthogneiss of, Skagit Gneiss Complex (NW)	TKog	TKog
501	McHale Slate (NE)	pꞒms	Yar_{2}
502	McIntosh Formation (SW)	Tm	Em_{1} Em_{2}
503	McNeely Drift (SW)	Qad	Qad
504	Megler, sandstone of (SW)	Tm	Em_{1}
505	Metaline Formation (NE)	Pzms	OꞒcb
506	Meteor, granite and granodiorite near (NE)	Mzl	KJia

No.	Geologic unit	1:500,000	1:250,000
507	Methow gneiss (NE)	Mzog	KJog
508	Meyer Ridge unit, R$_2$ Grande Ronde Basalt (SE)	Tv$_{cr}$	M̶v$_g$
509	Mica Peak, gneiss of (NE)	pꞒhm	pꞒbg pꞒqz
510	Middle Fork Nooksack River, lahar of the (NW)	Qvt	Qvl
511	Middle Peak, heterogeneous tonalite and granodiorite of, Chilliwack Composite batholith, Index family (NW)	Ti	Φit
512	Midnight Peak Formation (NE)	Mzc Mzv	Kc$_2$ Kv$_2$ Kvs$_2$
513	Midnight Peak Formation, undivided. Includes Ventura Member of the Midnight Peak Formation, listed separately. (NW)	Mzc Mzv	Kc$_2$ Kv$_2$
514	Midway, tuff at (SW)	Tvt	Ᵽvt
515	Milk Creek, olivine basalt of (SW)	Tv	Φvb
516	Milk Creek, tuff of (SW)	Tvt	Φvt
517	Mineral Mountain pluton, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	M̶ig
518	Mission argillite (NE)	Ᵽzms Ᵽzmv	COcg COmm Ocb Omm Omv
519	Mission Creek, gneissic porphyritic granodiorite of (NE)	Mzog	pTog
520	Missoula flood deposits, glacial Lake (SW)	Qf	Qfg Qfs
521	Missoula Group (NE)	pꞒms	Yms$_4$
522	Missoula Group, Belt Supergroup (SE)	pꞒms	Yms$_4$
523	Missoula, glacial lake, deposits (SE)	Qf	Qfs Qfg
524	Mobray drift (NW)	Qad	Qapw$_2$
524	Mobray drift (SW)	Qad	Qap
525	Money Creek gabbro (NW)	Mzl	pTigb
526	Monk Formation (NE)	pꞒms	Zmm
527	Monte Cristo stock, Grotto batholith, Snoqualmie family (NW)	Ti	M̶Φigd
528	Montesano Formation (NW)	Tm	M̶m$_2$
528	Montesano Formation (SW)	Tm	M̶m$_2$
529	Monument Peak stock (NE)	Ti	Eig
529	Monument Peak stock (NW)	Ti	Eig
530	Moses Mountain pluton (NE)	TKi	TKia TKiaa
531	Mount Adams, andesites of (SW)	Qv	Qva
532	Mount Aix volcanic complex (SW)	Ti	M̶Φiv
533	Mount Baker, andesite of, undivided (NW)	Qv	Qva
534	Mount Baker, andesite of. Includes and listed under: andesite of Bastile Ridge, andesite of Black Buttes, andesite of Coleman Pinnacle, andesite of Cougar Divide, andesite of Lasiocarpa Ridge, andesite of Lava Divide, andesite of Pinus Lake, andesite of The Portals, andesite of Swift Creek, and andesite of Table Mountain. (NW)		
535	Mount Ballard, volcanic breccia of, Virginian Ridge Formation, Pasayten Group (NW)	Mzv	Kv$_2$
536	Mount Benzarino, orthogneiss of (NW)	TKog	ᵽKog
537	Mount Blum, biotite alaskite of, Chilliwack composite batholith, Index family (NW)	Ti	Φig
538	Mount Bonaparte pluton (NE)	TKi Mzl	TKia TKiaa TKid
539	Mount Buckindy pluton, Cascade Pass family (NW)	Ti	M̶it M̶ix

No.	Geologic unit	1:500,000	1:250,000
540	Mount Catherine Rhyolite Member, Naches Formation (NW)	Tvt	Evt
541	Mount Daniel, volcanic rocks of (NW)	Tv Tvt, Ti	Φvd Φvr Φvt Φian Φir
542	Mount Despair, granodiorite of, Chilliwack composite batholith, Index family (NW)	Ti	Φigd Φii
543	Mount Herman, sedimentary rocks of, Chilliwack Group (NW)	Pzms	PDms
544	Mount Herman, volcanic rocks of, Chilliwack Group (NW)	Pzmv	PDmv
545	Mount Hinman, granite of, Snoqualmie batholith, Snoqualmie family (NW)	Ti	M̶Φig
546	Mount Josephine, semischist and phyllite of, Easton Metamorphic Suite (NW)	Mzms	Jph
547	Mount Persis, volcanic rocks of (NW)	Tv	Ev Eva
548	Mount Pilchuck stock (NW)	Ti	Eig
549	Mount Rahm, volcanic rocks of (NW)	Tvt	Φvx
550	Mount Rainier, andesites of (SW)	Qv	Qva
551	Mount Rainier, vent complexes on (SW)	Qi	Qian
552	Mount Rathdrum granite (NE)	Ti	Eiat
553	Mount Roberts Formation (NE)	Pzms	Pmm
554	Mount Sefrit gabbronorite, Chilliwack composite batholith, Snoqualmie family (NW)	Ti	M̶igb
555	Mount Spokane granite (NE)	Mzl TKi	Kiat TKiaa
556	Mount St. Helens 1980 debris avalanche (SW)	Qls	Qls
557	Mount St. Helens 1980 lahars (SW)	Qvt	Qvl
558	Mount St. Helens 1980 pumice flows (SW)	Qvt	Qvp
559	Mount St. Helens pre-1980 lahars (SW)	Qvt	Qvl
560	Mount St. Helens pre-1980 volcaniclastic deposits (SW)	Qvt	Qvc
561	Mount St. Helens, andesites of (SW)	Qv	Qva
562	Mount St. Helens, basalts of (SW)	Qv	Qvb
563	Mount St. Helens, Holocene domes on (SW)	Qi	Qida
564	Mount Stickney, drift of (NW)	Qad	Qap
565	Mount Stuart batholith, undivided (NW)	Mzl	Kid Kigb Kigd Kit
566	Mount Stuart batholith. Includes and listed under: Beckler Peak stocks and tonalite of Harding Mountain. (NW)		
567	Mount Tolman, quartz porphyry of (NE)	TKi	TKig
568	Mount Triumph, orthogneiss of (NW)	TKog	TKog
569	Mt. Horrible unit, R_2 Grande Ronde Basalt (SE)	Tv_{cr}	M̶v_g
570	Muddy River lahar (SW)	Qvt	Qvl
571	N_1 magnetostratigraphic unit of the Grande Ronde Basalt (SW)	Tv_{cr}	M̶v_g
572	N_1 magnetostratigraphic unit, Grande Ronde Basalt (SE)	Tv_{cr}	M̶v_g
573	N_2 magnetostratigraphic unit of the Grande Ronde Basalt (NE)	Tv_{cr}	M̶v_g M̶vi_g
573	N_2 magnetostratigraphic unit of the Grande Ronde Basalt (SW)	Tv_{cr}	M̶v_g
574	N_2 magnetostratigraphic unit, Grande Ronde Basalt (SE)	Tv_{cr}	M̶v_g
575	Naches Formation (SW)	Tc Tv	Ec_2 Ev Evb Evr
576	Naches Formation, undivided. Includes Guye Sedimentary Member, not listed separately. (NW)	Tc Tv	Ec_2 Ev Evb Evr

No.	Geologic unit	1:500,000	1:250,000
577	Naches Formation. Includes and listed under: Mount Catherine Rhyolite Member. (NW)		
578	Nahahum Canyon Member of the Chumstick Formation (NE)	Tc	Ec_2
579	Nanaimo Group, undivided (NW)	Mzn	Kn
580	Nanaimo Group. Locally divided into and listed under: Cedar District Formation, Comox Formation, Extension Formation, Haslam Formation, and Protection Formation. (NW)		
581	Napeequa River area, rocks of the. *See also* Napeequa Schist. (NW)	MzPzhm	JPhmc
582	Napeequa River area, rocks of the (NE)	MzPzhm Mzog	TRPhmc TRPmb Kog
583	Napeequa Schist (NW)	MzPzhm Mzog TKgn	JPhmc pTog TKbg
584	Napeequa Schist. Defined by Tabor and others (2002) to include: rocks of the Napeequa River area, Rainbow Lake Schist, Twisp Valley Schist, and part of Cascade River Schist of Misch (1966). (NW)		
585	Napeequa unit. *See* Napeequa Schist. (NW)		
586	Nason Ridge Migmatitic Gneiss (NW)	Mzgn Mzog	Kbg Kog
587	Needle, The, orthogneiss of, Skagit Gneiss Complex (NW)	Mzog	TRog
588	Needles–Gray Wolf lithic assemblage (NW)	Tm Tv	ΦEm ΦEmst ΦEvb
589	Nespelem Silt (NE)	Qf	Qgl Qglf
590	Newby Group (NE)	Mzv Mzm	KJvs KJvt KJm KJv Jm
591	Newby Group. Includes and listed under: Lookout Mountain unit. (NW)		
592	Newman Lake Gneiss (NE)	Mzog	Kog
593	Noname stock (NE)	Ti	Eigd
594	Nooksack Cirque, quartz monzonite and granite of, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	Riqm
595	Nooksack Formation, undivided (NW)	Mzms	KJmm
596	Nooksack Formation. Includes and listed under: Wells Creek volcanic member. (NW)		
597	North Creek Volcanics (NE)	Mzmv	KJmv
597	North Creek Volcanics (NW)	Mzmt	Kmt
598	North Fork Camp hybrid gneiss (NE)	Mzog	Jog
599	North Peak, metavolcanic rocks of (NW)	Pzmv	PDmv
600	North Star Creek, metadiorite near (NE)	Pzl	Pzib
601	Northcraft Formation (SW)	Tv Tvt	Eva Evc ΦEva ΦEvc ΦEvt
602	O'Brien Creek Formation (NE)	Tvt Tc	Evt_1 Evc_1 Ecg_1
603	Ohanapecosh Formation (SW)	Tv Tvt	Φva Φvc Φvr
604	Ohanapecosh Formation, undivided (NW)	Tvt	Φvc
605	Ohanapecosh Formation. Includes and listed under: Lake Keechelus tuff member. (NW)		
606	Okanogan batholithic complex (NE)	Mzl Mzog Mzmi	Kit Kigd KJog KJmi
607	Old Baldy pluton (NE)	Mzog	KJog
608	Old Dominion Limestone (NE)	Pzms	OЄcb
609	Old Gib volcanic neck, dacite of (NW)	Ti	Eir
610	Olequa Creek Member of the Cowlitz Formation (SW)	Tn	En

No.	Geologic unit	1:500,000	1:250,000
611	Olympia beds (NW)	Qa Qgd	Qc Qgpc Qguc
612	Omak Lake, porphyritic granodiorite southwest of (NE)	TKi	TKigd
613	Omeara Point, siltstone and sandstone at (SW)	Tm	Em$_2$
614	Orcas Chert. *See* Orcas Formation. (NW)		
615	Orcas Formation (NW)	Mzms	JTrmc
616	Ordway Creek stock (SW)	Ti	Eiqm
617	Orting Drift (SW)	Qgd	Qgp
618	Ortley unit, N_2 Grande Ronde Basalt (SE)	Tv$_{cr}$	Mv$_g$
619	Osceola Mudflow (NW)	Qvt	Qvl
619	Osceola Mudflow (SW)	Qvt	Qvl
620	Osoyoos batholith (NE)	Mzog	Trog
621	Oval Peak batholith (NE)	Ti TKog	Ꝑit Ꝑog
622	Oval Peak pluton (NW)	Ti	Ꝑit
623	Pack Sack Lookout, basalt of (SW)	Tv$_{cr}$	Mv$_s$ Mvi$_s$
624	Padden Member, Chuckanut Formation. *See* Chuckanut Formation. (NW)		
625	Palisades, welded tuff of The (SW)	Tvt	Mvt
626	Palmer Mountain Greenstone (NE)	Mzmv	Trmv
627	Palmer volcanics (NE)	Tv Tvt	Evd$_1$ Evc$_1$ Evc$_2$
628	Palouse Falls, basalt of, Frenchman Springs Member (SE)	Tv$_{cr}$	Mv$_w$
629	Palouse Formation (NE)	Ql	Ql
629	Palouse Formation (SE)	Ql	Ql
630	Panther Creek Formation (NE)	Mzm	Km$_1$
630	Panther Creek Formation (NW)	Mzm	Km$_1$
631	Paradise debris flow (SW)	Qvt	Qvl
632	Park Butte, basalt of (NW)	Qv	Qvb
633	Park granite stock (NE)	Mzl	Kig
634	Parmenter Creek, serpentine near (NE)	MzPzu	u
635	Partridge Gravel, Vashon Drift (NW)	Qgd	Qgo Qgos
636	Pasayten Group (Daly, 1912; Coates, 1974; R. A. Haugerud and R. W. Tabor, USGS, written commun., 2000). Includes and listed under: strata of Cow Creek, Devils Pass Member of the Virginian Ridge Formation, Goat Wall unit undivided, volcanic rocks of the Goat Wall unit, volcanic breccia of Mount Ballard, Slate Peak Member of the Virginian Ridge Formation, volcanic rocks of Three A M Mountain, Ventura Member of the Midnight Peak Formation, Virginian Ridge Formation undivided, and Winthrop Formation undivided. (NW)		
637	Pasayten stock (NE)	Mzl	Kigd
637	Pasayten stock (NW)	Mzl	Kigd
638	Pasco gravels (SE)	Qf	Qfg
639	Patterson Lake conglomerate (NE)	Mzc	Kcg$_1$
640	Pe Ell Volcanics Member of the Cowlitz Formation (SW)	Tvt	Evt
641	Pear Lake, gneissic tonalite of (NW)	Mzog	Kog
642	Pend Oreille Andesite (NE)	Tv	Evd$_1$
643	Pend Oreille sequence (NE)	Pzms Pzmt	CDmm CDmt

No.	Geologic unit	1:500,000	1:250,000
644	Peninsula tonalite (SW)	Mƶl	Jiq
645	Peoh Point, andesite of (SW)	Ti	Eida
646	Perry Creek phase, Chilliwack composite batholith, Snoqualmie family (NW)	Ti	M̶Φit
647	Peshastin Formation, Ingalls Tectonic Complex (NW)	Mƶms	Jar
648	Phillips Lake Granodiorite (NE)	Mƶl	Kiat
649	Pine Creek lahar (SW)	Qvt	Qvl
650	Pinus Lake, andesite of, andesite of Mount Baker (NW)	Qv	Qva
651	Pioneer Ridge, volcanic rocks of (NW)	Tv Tvt	Φvd Φvx
652	Pipestone Canyon Formation (NE)	Mƶc	TKc
653	Pocket Peak phase, Chilliwack composite batholith, Index family (NW)	Ti	Φig
654	Pogue Mountain quartz monzonite (NE)	Mƶl	Kiqm
655	Pomona Member of the Saddle Mountains Basalt (SW)	Tv_{cr}	M̶v_s M̶vi_s
656	Pomona Member, Saddle Mountains Basalt (SE)	Tv_{cr}	M̶v_s
657	Portals, The, andesite of, andesite of Mount Baker (NW)	Qv	Qva
658	Possession Drift (NW)	Qgd Qa	Qgpc Qguc
659	Price Glacier pluton, Chilliwack composite batholith, Index family (NW)	Ti	Φiq
660	Prichard Formation (NE)	pꞒms	Yms_1
661	Priest Lake, granodiorite of (NE)	Mƶl	Kigd
662	Priest Rapids Member of the Wanapum Basalt (NE)	Tv_{cr}	M̶v_w
662	Priest Rapids Member of the Wanapum Basalt (SW)	Tv_{cr}	M̶v_w
663	Priest Rapids Member, Wanapum Basalt (SE)	Tv_{cr}	M̶v_w
664	Priest River Group (NE)	pꞒms	Yar Yq Ycb
665	Protection Formation, Nanaimo Group (NW)	Mƶn	Kn
666	Puget Group (SW)	Tc	Ec_2
667	Puget Group, undivided (NW)	Tc	Ec_2
668	Puget Group (locally subdivided into and listed under: Renton Formation, Tiger Mountain Formation, and Tukwila Formation) (NW)		
669	Purple Creek, orthogneiss of, Skagit Gneiss Complex (NW)	TKog	TKog
670	Puyallup Formation (NW)	Qa Qgd	Qc Qgpc
670	Puyallup Formation (SW)	Qa	Qc
671	Pysht Formation, upper Twin River Group (NW)	Tm	M̶Φm
672	Quartz Mountain area, granodiorite gneiss complex of the (NE)	Mƶmi	KJmi
673	Quartz Mountain quartz diorite (SW)	Mƶl	Jiq
674	Quillayute Formation (NW)	Tn	ⱣM̶n
675	Quimper Sandstone (NW)	Tm	ΦEm
676	Quinault Formation (NW)	Tn	ⱣM̶n
677	Quincy interbed, Ellensburg Formation (SE)	Tc	M̶c
678	R_1 magnetostratigraphic unit of the Grande Ronde Basalt (SW)	Tv_{cr}	M̶v_g
679	R_1 magnetostratigraphic unit, Grande Ronde Basalt (SE)	Tv_{cr}	M̶v_g

No.	Geologic unit	1:500,000	1:250,000
680	R_2 magnetostratigraphic unit of the Grande Ronde Basalt (NE)	Tv_{cr}	₥v_g ₥vi_g
680	R_2 magnetostratigraphic unit of the Grande Ronde Basalt (SW)	Tv_{cr}	₥v_g
681	R_2 magnetostratigraphic unit, Grande Ronde Basalt (SE)	Tv_{cr}	₥v_g
682	Raging River Formation (NW)	Tm	Em
683	Railroad Creek pluton (NW)	Ti	Eigd
684	Rainbow Lake Schist. *See also* Napeequa Schist. (NW)	MzPzhm	JPhmc
685	Rainbow Mountain, orthogneiss of, Skagit Gneiss Complex (NW)	TKog	TKog
686	Rampart Mountain pluton (NW)	Ti	Eig
687	Randle laharic breccia-conglomerate (SW)	Tvt	₥vc
688	Rattlesnake Creek tuff (SW)	Tvt	₥Φvt
689	Rattlesnake Mountain, volcanic rocks of (NW)	Tvt	Φvc
690	Rattlesnake Ridge Member, Ellensburg Formation (SE)	Tc	₥c
691	Ravalli Group (NE)	pЄms	Yms_2
692	Ravalli Group, Belt Supergroup (SE)	pЄms	Yms_2
693	Red Shirt gabbro (NE)	Mzl	KJigb
694	Redoubt Creek, quartz monzodiorite of, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	₥iqm
695	Reed Creek quartz dioritic orthogneiss (NE)	Mzog	Mzog
696	Reeves Limestone Member of the Maitlen Phyllite (NE)	Pzms	Єcb
697	Remmel batholith, undivided (NW)	Mzog	KJog
698	Remmel batholith. Includes and listed under: tonalite of Doe Mountain. (NW)		
699	Renton Formation, Puget Group (NW)	Tc	Ec_2
700	Revett Formation (NE)	pЄms	Yms_2
701	Revett Formation, Ravalli Group (SE)	pЄms	Yms_2
702	Reynolds Peak phase, Black Peak batholith (NW)	Mzl	Kit
703	Riddle Peaks pluton (NW)	Mzl	Kigb
704	Ringold Formation (NE)	Tc	QᵽCg (now Ᵽ₥cg)
704	Ringold Formation (SE)	Tc	Ᵽ₥c Ᵽ₥cg
705	Rinker Ridge, slate of (NW)	Mzms	Jph
706	Roaring Creek, greenstone near (NE)	Mzam	pTam
707	Robinette Mountain, basalt of, Eckler Mountain Member (SE)	Tv_{cr}	₥v_w
708	Rock Creek stock (NW)	Mzl	Kigd
709	Rogers Bar, granodiorite of (NE)	Mzl	KJigd
710	Rogersburg unit, R_1 Grande Ronde Basalt (SE)	Tv_{cr}	₥v_g
711	Rosalia, basalt of, Priest Rapids Member (SE)	Tv_{cr}	₥v_w
712	Roslyn Formation (NW)	Tc	Ec_2
712	Roslyn Formation (SW)	Tc	Ec_2
713	Rossland Group (NE)	Mzmv Mzms	Jmv Jcg
714	Round Lake, breccia of (NW)	Tvt	Φvx

No.	Geologic unit	1:500,000	1:250,000
715	Round Mountain, gneiss near (NE)	pЄhm	pЄhm
716	Roza Member of the Wanapum Basalt (NE)	Tv_{cr}	$₥v_{w}$
716	Roza Member of the Wanapum Basalt (SW)	Tv_{cr}	$₥v_{w}$
717	Roza Member, Wanapum Basalt (SE)	Tv_{cr}	$₥v_{w}$
718	Ruby Creek heterogeneous plutonic belt (NW)	TKi	TKi
719	Russell Ranch Formation (SW)	Mzm Mzmv Mzv	KJm KJmct KJmv KJvb pTvr
720	Ruth Creek pluton, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	₥igd
721	Ruth Mountain, granite of, Chilliwack composite batholith, Cascade Pass family (NW)	Ti	Ᵽig
722	Saddle Mountains Basalt (NE)	Tv_{cr}	$₥v_{s}$
722	Saddle Mountains Basalt (SW)	Tv_{cr}	$₥v_{s}$ $₥vi_{s}$
723	Saddle Mountains Basalt, Columbia River Basalt Group (SE)	Tv_{cr}	$₥v_{s}$
724	Salmon Creek schists and gneisses (NE)	MzⱣhm	pJhm pJmb
725	Salmon Springs Drift (NW)	Qgd	Qgp Qgpc
725	Salmon Springs Drift (SW)	Qgd	Qgp
726	San Juan Creek, granite of, Grotto batholith, Snoqualmie family (NW)	Ti	₥Φig
727	Sand Creek, monzogranite of (NE)	MzI	Kig
728	Sand Hollow, basalt of, Frenchman Springs Member (SE)	Tv_{cr}	$₥v_{w}$
729	Sanpoil Volcanics (NE)	Tv Tvt	Evd_{1} Evt_{1} Ev_{1}
730	Saturday Rock pluton (SW)	Ti	₥id
731	Sauk ring dike, Index family (NW)	Ti	ΦEida
732	Scatter Creek Rhyodacite (NE)	Ti	Eida
733	Scow Bay, sandstone of (NW)	Tm	Em_{1}
734	Selah Member, Ellensburg Formation (SE)	Tc	₥c
735	Sentinel Bluffs unit, N_2 Grande Ronde Basalt (SE)	Tv_{cr}	$₥v_{g}$
736	Sentinel Gap, basalt of, Frenchman Springs Member (SE)	Tv_{cr}	$₥v_{w}$
737	Seven Devils Group (SE)	Mzmt	Ŧmt
738	Seven Fingered Jack pluton (NW)	MzI	Kit
739	Seventeenmile Mountain, quartz monzonite of (NE)	Ti	Eiqm
740	Shake Creek stock of Squire Creek stock, Index family (NW)	Ti	Φit
741	Shankers Bend alkalic complex (NE)	MzI	Jik
742	Shasket Creek, intrusive rocks of (NE)	MzI	Jik
743	Shedroof Conglomerate (NE)	pЄms	Zcg
744	Sheep Mountain area, hornblende gneisses of the (NE)	MzⱣam	pJam
745	Shellrock Point volcanics (NE)	Tv	Evd_{1}
746	Sheppard Granite (NE)	Ti	Eig
747	Shoalwater Bay, siltstone at (SW)	Tm	Em_{2}
748	Shuksan Greenschist, Easton Metamorphic Suite (NW)	Mzms	Jsh
749	Shuksan Metamorphic Suite. *See* Easton Metamorphic Suite. (NW)		

No.	Geologic unit	1:500,000	1:250,000
750	Shumaker Creek, basalt of, Eckler Mountain Member (SE)	Tv$_{cr}$	M̶v$_{w}$
751	Silesia Creek pluton, Chilliwack composite batholith, Index family (NW)	Ti	Φit
752	Sillusi, basalt of, Umatilla Member (SE)	Tv$_{cr}$	M̶v$_{s}$
753	Silver Creek, tonalite of, Cascade Pass family (NW)	Ti	M̶it
754	Silver Falls, basalt of, Frenchman Springs Member (SE)	Tv$_{cr}$	M̶v$_{w}$
755	Silver Pass Volcanic Member, Swauk Formation (NW)	Tv	Evd
756	Silver Point Quartz Monzonite (NE)	Ti	Eia
757	Silver Star pluton (SW)	Ti	M̶id M̶igd M̶iq
758	Simcoe Mountains, volcanic rocks of (SW)	Tv QTv	Ᵽvr QᏢvb
759	Similkameen composite pluton (NE)	Mzl	Jia Jik
760	Sisters Creek pluton (NW)	TKi	TKig
761	Sitkum Creek, stock on, Cascade Pass family (NW)	Ti	M̶igd
762	Skagit Gneiss (NE)	TKog	TKmi
763	Skagit Gneiss Complex, undivided (NW)	TKgn TKi TKog Mzog	TKbg TKig TKog TRog
764	Skagit Gneiss Complex. Includes and listed under: orthogneiss of Boulder Creek, leucogneiss of Lake Juanita, Marble Creek Orthogneiss, migmatitic orthogneiss of McGregor Mountain, orthogneiss of The Needle, orthogneiss of Purple Creek, orthogneiss of Rainbow Mountain, and orthogneiss of Stehekin. (NW)		
765	Skagit Volcanics. *See* volcanic rocks of Mount Rahm. (NW)		
766	Skamania volcanic rocks (SW)	Tv	Φva
767	Skamokawa Creek, siltstone of (SW)	Tm	Em$_{2}$
768	Skokomish Gravel (NW)	Qad	Qapo
769	Skokomish Gravel (SW)	Qa	Qoa
770	Skookumchuck Formation (SW)	Tn	En
771	Skymo complex (NW)	Mzl	KJigb
772	Skyscraper Mountain complex (SW)	Ti	M̶iv
773	Slack Canyon unit, N_2 Grande Ronde Basalt (SE)	Tv$_{cr}$	M̶v$_{g}$
774	Slate Peak Member, Virginian Ridge Formation, Pasayten Group (NW)	Mzc	Kc$_{2}$
775	Slide Member, Chuckanut Formation. *See* Chuckanut Formation. (NW)		
776	Slippery Creek, basalt of, Weissenfels Ridge Member (SE)	Tv$_{cr}$	M̶v$_{s}$
777	Sloan Creek plutons (NW)	Mzog	Kog
778	Snipes Mountain, conglomerate of, Ellensburg Formation (SE)	Tc	M̶cg
779	Snoqualmie batholith, undivided, Snoqualmie family (NW)	Ti	M̶ig M̶igd M̶it M̶Φig M̶Φigb M̶Φigd M̶Φix
780	Snoqualmie batholith. Includes and listed under: granite of Mount Hinman. (NW)		
781	Snoqualmie family. Includes and listed under: Chilliwack valley phase of the Chilliwack composite batholith, Dead Duck pluton, Grotto batholith undivided, Indian Mountain phase of the Chilliwack composite batholith, biotite granodiorite of Little Beaver Creek, Monte Cristo stock, granite of Mount Hinman, Mount Sefrit gabbronorite, Perry Creek phase of the Chilliwack composite batholith, granite of San Juan Creek, and Snoqualmie batholith undivided. (NW)		
782	Soap Lake Mountain, granodiorite of (NE)	Mzl	Kigd
783	Sooes River area, sandstone of (NW)	Tm Tvt	M̶Ebx ΦEm Em$_{2}$ Em$_{1}$ Em Evc

No.	Geologic unit	1:500,000	1:250,000
784	Sophie Mountain Formation (NE)	Mzc	Kcg$_2$
785	South Creek, metaconglomerate of (NW)	Mzms	Kmcg
786	Spanish Camp gneiss complex (NE)	Mzmi MzI	KJmi Kit
787	Spectacle Formation (NE)	Pzms	Pcb Pmm
788	Spencer Creek, sandstone of (SW)	Tvt	Φvc
789	Spencer Creek, welded tuff at (SW)	Tvt	Evt
790	Spider Mountain Schist. *See also* Cascade River Schist. (NW)	Mzhm	T̶Rhm
791	Spieden Group (NW)	Mzn	KJn
792	Spiketon Formation (SW)	Tc	Ec$_2$
793	Spirit Lake pluton (SW)	Ti	M̶ia M̶igd M̶iq M̶iqm
794	Spirit pluton (NE)	MzI	Kig Kiaa
795	Sprague Lake, basalt of (NE)	Tv$_{cr}$	M̶v$_s$
796	Sprague Lake, basalt of, (equivalent to basalt of Lewiston Orchards?) (SE)	Tv$_{cr}$	M̶v$_s$
797	Squaw Creek Member, Ellensburg Formation (SE)	Tc	M̶c
798	Squaw Mountain, plutonic and metamorphic complex of (NE)	Mzmi	KJmi
799	Squire Creek stock, undivided, Index family. Includes Shake Creek stock, listed separately. (NW)	Ti	Φiq Φit
800	St. Peters Creek, metamorphic rocks of (NE)	Mzhm MzPzhm	pThm pTmb pTsc
801	St. Regis Formation (NE)	pЄms	Yms$_2$
802	Starvation Flat Quartz Monzonite (NE)	MzI	Kia
803	Stehekin, orthogneiss of, Skagit Gneiss Complex (NW)	TKog	TKog
804	Steilacoom Gravel (SW)	Qgd	Qgog
805	Stensgar Dolomite (NE)	pЄms	Ycb$_2$
806	Stepstone Creek, granite of upper (NE)	Ti	Eig
807	Stevens Lake, plutonic complex west of (NE)	Mzmi	KJmi
808	Stevens Ridge Formation (SW)	Tvt	M̶Φvt M̶vt
809	Stevenson Ridge lavas (SW)	Tv	M̶va
810	Stillaguamish Sand Member, Vashon Drift (NW)	Qgd	Qgos
811	Stillwater Creek Member of the Cowlitz Formation (SW)	Tm	Em$_2$
812	Storm King Mountain, monzonite east of (NE)	Ti	Eiqm
813	Storm King pluton (NE)	TKi	TKia
814	Stranger Creek, gabbro near (NE)	MzI	KJigb
815	Striped Peak Formation (NE)	pЄms	Yms$_4$
816	Striped Peak Formation, Missoula Group (SE)	pЄms	Yms$_4$
817	Stuck Drift (SW)	Qgd	Qgp
818	Sugarloaf Peak, andesite of (NW)	Tv	M̶va
819	Suiattle fill, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvl
820	Sulphur Creek, basalt of (NW)	Qv	Qvb
821	Sulphur Mountain pluton (NW)	MzI Mzog	Kigd Kog

No.	Geologic unit	1:500,000	1:250,000
822	Sumas Drift (NW)	Qgd	Qgds
823	Sumas Mountain, metaconglomerate of, Bell Pass mélange (NW)	Mzms	pTms
824	Summit Creek pluton (NE)	Mzl Mzog	Kit KJog
825	Summit Creek sandstone (SW)	Tc	Ec_2
826	Summit Creek, basalt of (SW)	Tv	Evb
827	Summit-Frazer trondhjemitic gneiss (NE)	Mzl Mzog Mzmi	Kit KJog KJmi
828	Sunday Creek stock, Index batholith, Index family (NW)	Ti	Φigd
829	Swakane Biotite Gneiss (NE)	Mzgn	pЄgn (now pre-Tertiary)
829	Swakane Biotite Gneiss (NW)	Mzgn	pTgn
830	Swale Creek valley, sedimentary deposits of (SW)	QTc	QP̶c
831	Swauk Formation (NE)	Tc	Ec_1
831	Swauk Formation (SE)	Tc	Ec_1
831	Swauk Formation (SW)	Tc	Ec_1
832	Swauk Formation, undivided. Includes Silver Pass Volcanic Member, listed separately. (NW)	Tc	Ec_1 Ecg_1
833	Swawilla Basin, granite of (NE)	TKi	TKia TKiat
834	Swift Creek, andesite of, andesite of Mount Baker (NW)	Qv	Qva
835	Swift Creek, ignimbrite of, rocks of Kulshan caldera (NW)	Qvt	Qvt
836	Swimptkin Creek pluton (NE)	Ti	Eimd
837	Table Mountain, andesite of, andesite of Mount Baker (NW)	Qv	Qva
838	Tamarack Peak, stock near (NW)	Mzl	Kigd
839	Taneum Formation (SW)	Tv	Eva
840	Tatoosh pluton (SW)	Ti	M̶ia M̶ig M̶igd M̶iq M̶iqm
841	Teanaway dike swarm (NW)	Ti	Eib Eigb
842	Teanaway Formation (NW)	Tv	Evb Evr
842	Teanaway Formation (SW)	Tv	Evb
843	Teepee Butte Member, R_1 Grande Ronde Basalt (SE)	Tv_{cr}	M̶v_g
844	Tenas Mary Creek, metamorphic rocks of (NE)	Mzhm Mzam Mzgn Mzog MzP̶zhm	pThm pTam pTsc pTmb pTqz pTbg pTog
845	Tenmile Creek, basalt of, Weissenfels Ridge Member (SE)	Tv_{cr}	M̶v_s
846	Tenpeak pluton (NW)	Mzl	Kit
847	Texas Creek stock (NE)	Mzl	Kigd Kid
848	Third Beach Member, Makah Formation. *See* Makah Formation. (NW)		
849	Thorp Gravel (SE)	Tc	P̶M̶cg
849	Thorp Gravel (SW)	Tc	P̶c
850	Three A M Mountain, volcanic rocks of, Winthrop Formation, Pasayten Group (NW)	Mzv Mzc	Kv_2 Kc_2
851	Three Corner Rock, lava flows of (SW)	Tv	M̶va

No.	Geologic unit	1:500,000	1:250,000
852	Three Fools Creek sequence (R. A. Haugerud and R. W. Tabor, USGS, written commun., 2000). Includes and listed under: strata of Freezeout Creek, Harts Pass Formation undivided, conglomerate of the Harts Pass Formation, strata of Majestic Mountain, conglomeratic strata of Two Buttes Creek, and Jackita Ridge unit undivided. (NW)		
853	Three Sisters Formation (NE)	pꞒms	Zq
854	Tieton Andesite (SW)	Qv	Qva
855	Tiffany complex (NE)	Mzmi	KJmi
856	Tiffany Mountain, gneissic trondhjemite of (NE)	Mzmi	KJmi
857	Tiger Formation (NE)	Tc	Ecg_2
858	Tiger Mountain Formation, Puget Group (NW)	Tc	Ec_2
859	Tillman Mountain tonalitic gneiss (NE)	Mzog	Ŧog
860	Toats Coulee pluton (NE)	Mzog Mzl	Jog KJiq
861	Togo Formation (NE)	pꞒms	Yar_1
862	Tonasket Gneiss (NE)	Mzgn	pTbg
863	Tonga Formation (NW)	Mzhm Mzms	Mzsc Mzsh
864	Touchet Beds (SE)	Qf	Qfs
865	Toutle Formation (SW)	Tn	ΦEn
866	Toutle River lahars (S4W)	Qvt	Qvl
867	Trafton sequence (NW)	MzPzmt Pzl	JMmt Pl
868	Trafton terrane. *See* Trafton sequence. (NW)		
869	Troublesome Mountain, metaporphyry on, Index batholith, Index family (NW)	Ti	Φian
870	Trout Lake mudflow (SW)	Qvt	Qvl
871	Troutdale Formation (SW)	QTc	QPc
872	Tuckaway Lake gneiss (NE)	tz	tz
873	Tukwila Formation, Puget Group (NW)	Tvt	Evc
874	Tumtum Mountain, Pleistocene dome at (SW)	Qi	Qida
875	Turtleback Complex (NW)	Pzl	pDi
876	Twentyfive Mile Creek, amphibolite and schist of (NE)	MzPzhm	ŦPhmc
877	Twin Creeks drift (NW)	Qad	Qad Qao
878	Twin Lakes, mafic intrusive rocks near (NE)	Pzl	Oigb
879	Twin Peaks, andesite of (NE)	Tv Tvt	Evd_1 Evt_1
880	Twin River Group, lower. *See* Hoko River Formation. (NW)		
881	Twin River Group, middle. *See* Makah Formation. (NW)		
882	Twin River Group, upper. *See* Pysht Formation. (NW)		
883	Twin Sisters Dunite, Bell Pass mélange (NW)	MzPzu	pTu
884	Twisp Formation (NE)	Mzm	Jm
885	Twisp River valley, plagioclase porphyry of (NW)	Mzmt	Kmt
886	Twisp Valley schist (NE)	MzPzhm	ŦPhmc
887	Twisp Valley Schist. *See also* Napeequa Schist. (NW)	MzPzhm	JPhmc
888	Two Buttes Creek, conglomeratic strata of, Jackita Ridge unit, Three Fools Creek sequence (NW)	Mzm	Km_1

No.	Geologic unit	1:500,000	1:250,000
889	Umatilla Member of the Saddle Mountains Basalt (SW)	Tv$_{cr}$	M̶v$_{s}$
890	Umatilla Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	M̶v$_{s}$
891	Umatilla, basalt of, Umatilla Member (SE)	Tv$_{cr}$	M̶v$_{s}$
892	Umtanum unit, N_2 Grande Ronde Basalt (SE)	Tv$_{cr}$	M̶v$_{g}$
893	Unit A of Wolfe and McKee (1972) (SW)	Tm	Em$_{1}$
894	Unit B of Wolfe and McKee (1972) (SW)	Tm Tv	Em$_{2}$ Evb ΦEm
895	Vantage Member, Ellensburg Formation (SE)	Tc	M̶c
896	Vashon Drift (SW)	Qgd	Qga Qgd Qgo Qgog Qgos Qgt
897	Vashon Drift, undivided. Includes Lawton Clay Member and Pilchuck Clay Member, not listed separately. (NW)	Qgd Qf Qa	Qga Qgd Qgl Qgo Qgog Qgos Qgt Qguc
898	Vashon Drift. Includes and listed under: Arlington Gravel Member, Colvos Sand Member, Esperance Sand Member, Marysville Sand Member, Partridge Gravel, and Stillaguamish Sand Member. (NW)		
899	Vedder complex, Bell Pass mélange (NW)	Pzms MzPzmt	pPsh pTmt
900	Ventura member of the Midnight Peak Formation (NE)	Mzc	Kc$_{2}$
901	Ventura Member, Midnight Peak Formation, Goat Wall unit, Pasayten Group (NW)	Mzc	Kc$_{2}$
902	Virginia Lake, equigranular granite of (NE)	Mzl	Kig Kiaa
903	Virginian Ridge Formation (NE)	Mzm Mzc	Km$_{2}$ Kcg$_{2}$
904	Virginian Ridge Formation, undivided, Pasayten Group (NW)	Mzms	Kmcg
905	Virginian Ridge Formation. Includes and listed under: strata of Cow Creek, Devils Pass Member, volcanic breccia of Mount Ballard, and Slate Peak Member. (NW)		
906	Volcanic member of the Midnight Peak Formation (NE)	Mzv	Kv$_{2}$ Kvs$_{2}$
907	Waatch Point, siltstone of (NW)	Tm	Em$_{2}$
908	Waatch Quarry, siltstone and sandstone of (NW)	Tm	Em$_{2}$
909	Wahluke, basalt of, Wilbur Creek Member (SE)	Tv$_{cr}$	M̶v$_{s}$
910	Wakefield, orthogneiss near (NE)	Mzl Mzmi	Kit KJmi
911	Wallace Formation (NE)	pЄms	Yms$_{3}$
912	Wanapum Basalt (NE)	Tv$_{cr}$	M̶v$_{w}$
912	Wanapum Basalt (SW)	Tv$_{cr}$	M̶v$_{w}$
913	Wanapum Basalt, Columbia River Basalt Group (SE)	Tv$_{cr}$	M̶v$_{w}$
914	Wapshilla Ridge unit, R_2 Grande Ronde Basalt (SE)	Tv$_{cr}$	M̶v$_{g}$
915	War Creek gneiss (NE)	TKog	Rog
916	War Creek, gneiss of (NW)	TKog	Rog
917	Ward Gap flow, Elephant Mountain Member (SE)	Tv$_{cr}$	M̶v$_{s}$
918	Warnick Member, Chuckanut Formation. *See* Chuckanut Formation. (NW)		
919	Wauconda pluton (NE)	Mzl	KJigd
920	Weatherwax formation (NW)	Qad	Qapw$_{1}$ Qapw$_{2}$
920	Weatherwax formation (SW)	Qad	Qapo
921	Wedekind Creek formation (NW)	Qad	Qapw$_{1}$
921	Wedekind Creek formation (SW)	Qad	Qapo

No.	Geologic unit	1:500,000	1:250,000
922	Weissenfels Ridge Member of the Saddle Mountains Basalt (NE)	Tv$_{cr}$	₥v$_{s}$
923	Weissenfels Ridge Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	₥v$_{s}$
924	Wells Creek volcanic member, Nooksack Formation (NW)	Mzmv	Jmvd
925	Wenatchee Formation (NE)	Tc	Φc
926	Wenatchee Ridge, banded gneiss of (NW)	Mzgn	Kbg
927	Wenatchee Ridge, light-colored gneiss of (NW)	Mzog	Kog
928	West Fork, intrusive rhyolite near (NE)	Ti	Eir
929	Western mélange belt (NW)	MzI MzPzu Mzms Mzmv	Jib Jit Ju KJmc KJmm KJmv pTigb
930	Western Olympic lithic assemblage (NW)	Tm Tv	₥Em ₥Emst ΦEm ΦEmst ΦEvb
931	Whale Creek drift (NW)	Qad	Qapw$_{2}$
932	Whidbey Formation (NW)	Qa Qgd	Qc Qgpc Qguc
933	Whiskey Mountain pluton (NE)	MzI	KJigd KJiq
934	White Chuck assemblage, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvl Qvt Qvp
935	White Chuck cinder cone, volcanic rocks and deposits of Glacier Peak (NW)	Qv	Qvb
936	White Chuck fill, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvl Qvt
937	White Chuck tuff, volcanic rocks and deposits of Glacier Peak (NW)	Qvt	Qvt
938	White River pluton (SW)	Ti	₥igd
939	White River rheoignimbrite (SW)	Tv	₥vr
940	White Salmon drift (SW)	Qad	Qap
941	Whitehorse Mountain, volcanic rocks of, Eastern mélange belt (NW)	Mzmt	JTRmt
942	Wilbur Creek Member of the Saddle Mountains Basalt (SW)	Tv$_{cr}$	₥v$_{s}$
943	Wilbur Creek Member, Saddle Mountains Basalt (SE)	Tv$_{cr}$	₥v$_{s}$
944	Wild Sheep Creek Formation (SE)	Mzmt	TRmt
945	Wildcat Creek, tuffaceous rocks of (SW)	Qvt	Qvc