

Identification_Information:

Citation:

Citation_Information:

Originator: R. W. Tabor

Originator: D. B. Booth

Originator: J. A. Vance

Originator :A. B. Ford

Publication_Date: 2002 (paper copy); 2006 (digital database)

Title: Geologic Map of the Sauk River 30- by 60 Minute Quadrangle, Washington

Edition: 1.0

Geospatial_Data_Presentation_Form: vector digital data

Series_Information:

Series_Name: U.S. Geological Survey Miscellaneous Investigation Series

Issue_Identification: I-2592

Publication_Information:

Publication_Place: Menlo Park, CA

Publisher: U.S. Geological Survey

Online_Linkage: <http://pubs.usgs.gov/imap/i2592/>

Description:

Abstract: Abstract: This digital map database has been prepared by R.W. Tabor from the published Geologic map of the Sauk River 30- by 60 Minute Quadrangle, Washington. Together with the accompanying text files as PDF, it provides information on the geologic structure and stratigraphy of the area covered. The database delineates map units that are identified by general age and lithology following the stratigraphic nomenclature of the U.S. Geological Survey. The authors mapped most of the bedrock geology at 1:100,000 scale, but compiled most Quaternary units at 1:24,000 scale. The Quaternary contacts and structural data have been much simplified for the 1:100,000-scale map and database. The spatial resolution (scale) of the database is 1:100,000 or smaller.

Purpose: This database depicts the distribution of geologic materials and structures at a regional (1:100,000) scale. The report is intended to provide geologic information for the regional study of materials properties, earthquake shaking, landslide potential, mineral hazards, seismic velocity, and earthquake faults. In addition, the report contains information and interpretations about the regional geologic history and framework. However, the regional scale of this report does not provide sufficient detail for site development purposes.

Supplemental_Information

DIGITAL COMPILATION- R. W. Tabor scanned, vectorized and edited the geologic map information from stable ink-on-mylar author compilation at 1:100,000 scale. ARC/INFO vectorized coverage of the geology was later edited by K. Nimtz with assistance from Taryn A. Lindquist.

The digital compilation was done in versions 7.1.1 through 8.2 of ARC/INFO with version 3.0 of the menu interface ALACARTE (Fitzgibbon and Wentworth, 1991, Fitzgibbon, 1991, Wentworth and Fitzgibbon, 1991).

BASE MAP-The geology of this dataset was mapped on dimensionally stable chronflex prints of the Sauk River 1:100,000 scale topographic quadrangle. Although no base map material is included in this dataset, a vectorized version of the base can be downloaded from <http://edcftp.cr.usgs.gov/pub/data/DLG/100K/S/>.

SPATIAL RESOLUTION- Uses of this digital geologic map should not violate the spatial resolution of the data. Although the digital form of the data removes the constraint imposed by the scale of a paper map, the detail and accuracy inherent in map scale are also present in the digital data. The

fact that this database was edited for a scale of 1:100,000 means that higher resolution information is not present in the dataset. Plotting at scales larger than 1:100,000 will not yield greater real detail, although it may reveal fine- scale irregularities below the intended resolution of the database. Similarly, where this database is used in combination with other data of higher resolution, the resolution of the combined output will be limited by the lower resolution of these data.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2002 (paper); 2006 (digital database)

Currentness_Reference: 2002.

Status:

Progress: Complete

Maintenance_and_Update_Frequency: As needed

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -122.009731

East_Bounding_Coordinate: -120.980508

North_Bounding_Coordinate: 48.512953

South_Bounding_Coordinate: 47.986880

Keywords:

Theme:

Theme:

Place:

Theme_Keyword_Thesaurus: none

Theme_Keyword: alpine glaciation

Theme_Keyword: Bald Mountain pluton

Theme_Keyword: Barlow Pass Volcanics

Theme_Keyword: bedrock geology

Theme_Keyword: Bell Pass melange

Theme_Keyword: Cascade River Schist

Theme_Keyword: Cascade Pass Family

Theme_Keyword: Chaval pluton

Theme_Keyword: Chelan Mountains terrane

Theme_Keyword: Chilliwack Group

Theme_Keyword: Chiwaukum Schist

Theme_Keyword: Cordilleran Ice Sheet

Theme_Keyword: Cyclone Lake pluton

Theme_Keyword: Darrington Phyllite

Theme_Keyword: Darrington-Devils Mountain Fault Zone

Theme_Keyword: drainage diversion

Theme_Keyword: Eastern melange belt

Theme_Keyword: Easton Metamorphic Suite

Theme_Keyword: Easton terrane

Theme_Keyword: Eldorado Orthogneiss

Theme_Keyword: Entiat Fault

Theme_Keyword: erosional landscape

Theme_Keyword: fault offset

Theme_Keyword: Fraser glaciation
 Theme_Keyword: geologic history
 Theme_Keyword: geologic structures
 Theme_Keyword: geology
 Theme_Keyword: glacial geology
 Theme_Keyword: Glacier Peak
 Theme_Keyword: Helena-Haystack melange
 Theme_Keyword: Hidden Lake stock
 Theme_Keyword: Jorden Lake pluton
 Theme_Keyword: Index Family
 Theme_Keyword: landslide deposits
 Theme_Keyword: Marblemount pluton
 Theme_Keyword: Magic Mountain Gneiss
 Theme_Keyword: melange
 Theme_Keyword: metamorphism
 Theme_Keyword: Mount Stuart batholith
 Theme_Keyword: Nason Ridge Migmatitic Gneiss
 Theme_Keyword: Nason terrane
 Theme_Keyword: Nsapeequa Schist
 Theme_Keyword: North Cascades
 Theme_Keyword: Northwest Cascade System
 Theme_Keyword: radiometric ages
 Theme_Keyword: rock samples
 Theme_Keyword: Shuksan Greenschist
 Theme_Keyword: Slate of Rinker Ridge
 Theme_Keyword: Sloan Creek plutons
 Theme_Keyword: Snoqualmie Family
 Theme_Keyword: Straight Creek Fault
 Theme_Keyword: stitching units
 Theme_Keyword: Sulphur Mountain pluton
 Theme_Keyword: surficial geology
 Theme_Keyword: Swakane Biotite Gneiss
 Theme_Keyword: Swauk Formation
 Theme_Keyword: Tenpeak Mountain pluton
 Theme_Keyword: terrane overlap units
 Theme_Keyword: Tonga Formation
 Theme_Keyword: transtensional deposits
 Theme_Keyword: Vashon stade
 Theme_Keyword: Volcanic rocks of Gamma Ridge
 Theme_Keyword: Western melange belt
 Theme_Keyword: Yellow Aster Complex
 Theme_Keyword_Thesaurus: none

Place:

Place_Keyword_Thesaurus: none
 Place_Keyword: Pacific Northwest
 Place_Keyword: North Cascade Mountains
 Place_Keyword: Sauk River
 Place_Keyword: Washington

Place:

Place_Keyword_Thesaurus: Augmented FIPS 10-4 and FIPS 6-4, version 1.0

Place_Keyword: Snohomish

Place_Keyword: Chelan County

Place_Keyword: Skagit County

Theme_Keyword_Thesaurus: REQUIRED: Reference to a formally registered thesaurus or a similar authoritative source of theme keywords.

Theme_Keyword: REQUIRED: Common-use word or phrase used to describe the subject of the data set.

Access_Constraints: REQUIRED: Restrictions and legal prerequisites for accessing the data set.

Use_Constraints: REQUIRED: Restrictions and legal prerequisites for using the data set after access is granted.

Native_Data_Set_Environment: Microsoft Windows 2000 Version 5.0 (Build 2195) Service Pack 4; ESRI ArcCatalog 9.0.0.535

Spatial_Data_Organization_Information: srgeology is contact, fault, and polygon coverage; srlines is fold axes, cross-section lines, river-cut terrace boundaries, and mineral isograds; srlines is location of map symbols for folds and arrowheads indicating direction of plunge of large folds; srsamp_smoc is locations of age, fossil, and chemically analyzed samples and locations of small outcrops of ultramafic rocks, limestone or marble, and Vedder Complex too small to show at map scale; srcleavage is zone of well developed foliation in western and eastern melange belts; srdikes is areas underlain by numerous granite and granite porphyry dikes associated with the Pilchuck stock and Bald Mountain pluton; srstructure is structural symbols: bedding: foliation, lineation, and fault balls (These symbols will not show on screen or plot without appropriate symbol sets available in Alacarte); srrocksamp is a point coverage of rock samples archived at North Cascades National Park, Marblemount. For more information about the rock samples contact the curator at Marblemount, telephone 360 873 4500.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 6041

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Label point

Point_and_Vector_Object_Count: 2330

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains

Point_and_Vector_Object_Count: 2330

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 37

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Label point

Point_and_Vector_Object_Count: 0

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Transverse Mercator
Transverse_Mercator:
Scale_Factor_at_Central_Meridian: 0.999600
Longitude_of_Central_Meridian: -123.000000
Latitude_of_Projection-Origin: 0.000000
False_Easting: 500000.000000
False_Northing: 0.000000
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 0.000128
Ordinate_Resolution: 0.000128
Planar_Distance_Units: meters
Geodetic_Model:
Horizontal_Datum_Name: D_Clarke_1866
Ellipsoid_Name: Clarke 1866
Semi-major_Axis: 6378206.400000
Denominator_of_Flattening_Ratio: 294.978698
Entity_and_Attribute_Information:
Detailed_Description: **srgeology**
Entity_Type:
Entity_Type_Label: srgeology.aat
Attribute:
Attribute_Label: FID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.
Attribute:
Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.
Attribute:
Attribute_Label: FNODE#
Attribute_Definition: Internal node number for the beginning of an arc (from-node).
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Whole numbers that are automatically generated.
Attribute:
Attribute_Label: TNODE#
Attribute_Definition: Internal node number for the end of an arc (to-node).
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Whole numbers that are automatically generated.
Attribute:

Attribute_Label: LPOLY#

Attribute_Definition: Internal node number for the left polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: RPOLY#

Attribute_Definition: Internal node number for the right polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: LENGTH

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SRGEOLOGY#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRGEOLOGY-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LTYPE

Attribute_Definition: Geologic contact description

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: contact, certain

Enumerated_Domain_Value_Definition: Boundary between geologic units established in reconnaissance mapping by authors or compiled from other workers

Enumerated_Domain:

Enumerated_Domain_Value: contact, concealed

Enumerated_Domain_Value_Definition: Boundary between geologic units that is concealed by a younger units

Enumerated_Domain:

Enumerated_Domain_Value: contact, inferred

Enumerated_Domain_Value_Definition: Boundary of uncertain location between geologic units; contact exists but location inferred from indirect evidence

Enumerated_Domain:

Enumerated_Domain_Value: contact, gradational

Enumerated_Domain_Value_Definition: Boundary between geologic units that is indefinite or gradational

Enumerated_Domain:

Enumerated_Domain_Value: normal fault, certain

Enumerated_Domain_Value_Definition: Trace of fault established in reconnaissance mapping by authors or compiled from other workers

Enumerated_Domain:

Enumerated_Domain_Value: normal fault, inferred

Enumerated_Domain_Value_Definition: Uncertain location of fault; positional accuracy uncertain but but general location inferred from indirect evidence

Enumerated_Domain:

Enumerated_Domain_Value: normal fault, concealed

Enumerated_Domain_Value_Definition: Trace of fault concealed by younger unit; positional accuracy uncertain

Enumerated_Domain:

Enumerated_Domain_Value: thrust fault, certain

Enumerated_Domain_Value_Definition: Trace of fault established in reconnaissance mapping by authors or compiled from other workers

Enumerated_Domain:

Enumerated_Domain_Value: thrust fault, concealed

Enumerated_Domain_Value_Definition: Trace of thrust fault concealed by younger unit; positional accuracy uncertain

Enumerated_Domain_Value: thrust fault, inferred

Enumerated_Domain_Value_Definition: Uncertain location of fault; positional accuracy uncertain but but general location inferred from indirect evidence

Enumerated_Domain:

Enumerated_Domain_Value: map boundary, certain

Enumerated_Domain_Value_Definition: map boundary of this 1:100,000 study

Enumerated_Domain:

Enumerated_Domain_Value: glacier boundary, certain

Enumerated_Domain_Value_Definition: Boundary of glacier derived from Sauk River 1:100,000 scale topographic map

Enumerated_Domain:

Enumerated_Domain_Value: water boundary, certain

Enumerated_Domain_Value_Definition: Boundary of open water derived from Sauk River 1:100,000 scale topographic map

Entity_Type:

Entity_Type_Label: srgeology.pat

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Perimeter of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SRGEOLOGY#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRGEOLOGY-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PTYPE

Attribute_Definition: symbol of geologic unit

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: QI

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Landslide deposits**

(Holocene)—Diamictons composed of angular clasts of bedrock and surficial deposits derived from upslope. Arrows denote downslope direction of movement. Unit includes both transported material and unstable scarp area if present

Enumerated_Domain:

Enumerated_Domain_Value: Qbi

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Incipient blockslides**

(Holocene)—Large unrotated masses of bedrock crevassed or otherwise deformed as a result of slight movement toward nearby free face. Recognized primarily from air photos. Arrow shows direction of movement

Enumerated_Domain:

Enumerated_Domain_Value: Qmw

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Mass-wastage deposits**

(Holocene and Pleistocene)—Colluvium, soil, or landslide debris with indistinct morphology,

mapped where sufficiently continuous and thick to obscure underlying material. Unit is gradational with units Qf and Ql

Enumerated_Domain:

Enumerated_Domain_Value: Qt

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Talus deposits**

(Holocene)—Non-sorted angular boulder gravel to boulder diamicton. At lower elevations gradational with unit Qf. At higher elevations includes small rock-avalanche deposits, as well as some Holocene moraines, rock glaciers, and protalus rampart deposits that lack characteristic morphology. Surfaces generally unvegetated

Enumerated_Domain:

Enumerated_Domain_Value: Qf

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Alluvial-fan deposits**

(Holocene)—Poorly sorted cobble to boulder gravel, deposited either as a discrete lobe at the intersection of a steep stream with a valley floor of lower gradient or as a broad apron on steep sideslopes

Enumerated_Domain:

Enumerated_Domain_Value: Qb

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Bog deposits**

(Holocene)—Peat and alluvium. Poorly drained and intermittently wet. Grades into unit Qyal

Enumerated_Domain:

Enumerated_Domain_Value: Qyal

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Younger alluvium**

(Holocene)—Moderately sorted deposits of cobble gravel to pebbly sand along rivers and streams. Generally unvegetated surfaces; gradational with units Qf and Qb

Enumerated_Domain:

Enumerated_Domain_Value: Qoal

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Older alluvium**

(Holocene and Pleistocene)—Deposits similar to unit Qyal, but standing above modern floodplain level and generally separated from it by a distinct topographic scarp. Age of deposits presumed younger than that of unit Qvr, but relations are ambiguous in some localities

Enumerated_Domain:

Enumerated_Domain_Value: Qa

Enumerated_Domain_Value_Definition: NON-GLACIAL DEPOSIT: **Alluvium and mass-wastage deposits, undivided (Holocene and Pleistocene)**—Undivided deposits composed of units Qf, Qyal, Qmw, Qvt, and Qvr, intermixed on the sides and floors of upland stream valleys. Similar to unit Qag in heterogeneity but occurring where deposits of alpine glaciers have been later obscured or are absent

Enumerated_Domain:

Enumerated_Domain_Value: Qag

Enumerated_Domain_Value_Definition: GLACIAL DEPOSITS: **Alpine glacial deposits**

(Holocene and Pleistocene)—Deposits ranging from boulder till in uplands and upvalley to gravel or sand outwash on broad valley floors. On valley sides and uplands, includes areas veneered with drift, but also includes bedrock, alluvial fans, colluvium, or talus deposits. On valley floors, also includes small fans, bogs, and modern stream alluvium. Areas of thin, sparse drift not distinguished from bedrock. Includes indistinct moraines near outlets of Heather Lake and Lake Twentytwo. Miller (1969) has described neoglacial moraines below South Cascade and Le Conte Glaciers

Enumerated_Domain:

Enumerated_Domain_Value: Qvr

Enumerated_Domain_Value_Definition: GLACIAL DEPOSITS: *Deposits of the Fraser glaciation of Armstrong and others (1965)*: **Vashon Drift (Pleistocene): Recessional outwash deposits**—Stratified sand and gravel, moderately sorted to well-sorted, and well-bedded silty sand to silty clay. This deposit formed predominantly in outwash plain and valley train environments in lowland areas.

Enumerated_Domain:

Enumerated_Domain_Value: Qvrs

Enumerated_Domain_Value_Definition: GLACIAL DEPOSITS: *Deposits of the Fraser glaciation of Armstrong and others (1965)*: **Vashon Drift (Pleistocene): Recessional outwash deposits: Stillaguamish Sand Member**

Enumerated_Domain:

Enumerated_Domain_Value: Qvi

Enumerated_Domain_Value_Definition: GLACIAL DEPOSITS: *Deposits of the Fraser glaciation of Armstrong and others (1965)*: **Vashon Drift (Pleistocene): Ice-contact deposits**—Similar in texture to unit Qvr, but containing collapse features, abrupt grain-size changes, or till lenses that indicate deposition near stagnant or active ice

Enumerated_Domain:

Enumerated_Domain_Value: Qvt

Enumerated_Domain_Value_Definition: GLACIAL DEPOSITS: *Deposits of the Fraser glaciation of Armstrong and others (1965)*: **Vashon Drift (Pleistocene): Till**—Mainly compact diamicton with subangular to rounded clasts, glacially transported and deposited. In ice-marginal areas or where covered by a thin layer of recessional outwash, contact with units Qvi or Qvr is gradational. Mapped areas also include deposits of units Qf, Qmw, and Qyal that are poorly exposed or too small to show at this map scale

Enumerated_Domain:

Enumerated_Domain_Value: Qva

Enumerated_Domain_Value_Definition: GLACIAL DEPOSITS: *Deposits of the Fraser glaciation of Armstrong and others (1965)*: **Vashon Drift (Pleistocene): Advance outwash deposits**—Well-bedded gravelly sand, fine-grained sand, and bedded silt, generally firm and unoxidized; deposited by proglacial streams and in proglacial lakes

Enumerated_Domain:

Enumerated_Domain_Value: Qtb

Enumerated_Domain_Value_Definition: EARLY GLACIAL AND NON-GLACIAL DEPOSITS: **Transitional beds (Pleistocene)**—Laminated clayey silt to clay that either pre-date or were formed during the early part of the Vashon stage; rare dropstones present

Enumerated_Domain:

Enumerated_Domain_Value: Qpf

Enumerated_Domain_Value_Definition: EARLY GLACIAL AND NON-GLACIAL DEPOSITS: **Non-glacial and glacial sedimentary deposits of pre-Fraser glaciation-age (Pleistocene)**—Moderately to deeply weathered, moderately sorted sand and gravel. Weathering rinds 1-3 mm thick on fine-grained volcanic clasts. Exposed only in the western part of quadrangle along north and south boundaries

Enumerated_Domain:

Enumerated_Domain_Value: Qglh

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Laharic deposits (Holocene and Pleistocene)**—Boulder

diamicton to well-sorted sand and gravel with characteristic clasts of pumice and volcanic rocks from Glacier Peak; found along Suiattle, White Chuck, Sauk, and North Fork of the Stillaguamish Rivers. Includes deposits of unit Qyal where alluvium is too narrow to easily distinguish at this map scale

Enumerated_Domain:

Enumerated_Domain_Value: Qgp

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Pumice deposits (Holocene)**—Mostly unconsolidated dacitic ash and pumice clast deposits as thick as 3 m

Enumerated_Domain:

Enumerated_Domain_Value: Qgwf

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Deposits of the White Chuck fill (Holocene and Pleistocene)**—Well-bedded assemblage of lahars, pyroclastic flow deposits, alluvium, and reworked ash and silt. Parts of unit grade into unit Qglh downvalley. May also include some younger deposits.

Enumerated_Domain:

Enumerated_Domain_Value: Qgwt

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Deposits of the White Chuck fill (Holocene and Pleistocene)**—An indurated, cliff-forming dacitic vitric tuff crops out in upper part of the White Chuck fill. The tuff is depicted on the map as forming a cap on the fill, but in reality, the tuff is overlain by at least one lahar (Beget, 1981, p. 59)

Enumerated_Domain:

Enumerated_Domain_Value: Qgsf

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Deposits of the Suiattle fill (Holocene)**—Well-bedded assemblage of lahars, pyroclastic flows, air-fall ash, alluvium, and rare lava flows. Deposit grades downvalley into unit Qglh

Enumerated_Domain:

Enumerated_Domain_Value: Qgd

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Dacite (Holocene and (or) Pleistocene)**—Mostly clinopyroxene-hypersthene dacite. Forms flows and volcanic rubble on Glacier Peak volcano

Enumerated_Domain:

Enumerated_Domain_Value: Qgdp

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Dacite of Disappointment Peak (Holocene and (or) Pleistocene)**—Oxyhornblende-hypersthene dacite forming massive, partly eroded dom

Enumerated_Domain:

Enumerated_Domain_Value: Qcc

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Cinder cones (Holocene)**—White Chuck Cinder Cone consisting of basalt lapilli and minor bombs with a few interbedded olivine basalt flows. Cinder cone remnant just north of Indian Pass (just south of Sauk River quadrangle) is mostly composed of well-stratified tuff and breccia

Enumerated_Domain:

Enumerated_Domain_Value: Qaf

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits (Holocene and Pleistocene): Andesite flow (Holocene and (or) Pleistocene)**—Eroded remnant of columnar-jointed olivine andesite flow at mouth of Lightning Creek

Enumerated_Domain:

Enumerated_Domain_Value: Tgrv

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Volcanic rocks of Gamma Ridge (Pliocene): Volcanic rocks**—Altered tuff, volcanic breccia, volcanic sandstone, welded tuff, and minor flows of basalt. Variegated red, brown, green, and white; bedding obscure; altered to carbonate minerals, sericite, clays, and chlorite; siliceous kaolinite common near Gamma Peak; glassy rocks commonly spherulitic; common veins of zeolites, carbonate minerals, and quartz. Before alteration, composition ranged from rhyolite to basalt

Enumerated_Domain:

Enumerated_Domain_Value: Tgrc

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Volcanic rocks of Gamma Ridge (Pliocene): Conglomerate**—White to dirty-gray tuffaceous conglomerate. Poorly bedded, composed of cobbles of granitoid rocks, quartzite, schist, and light-colored holocrystalline volcanic rocks in a fine-grained matrix of volcanic subquartzose sandstone that is much altered to greenish-yellow chlorite(?). Locally composed entirely of andesite cobbles

Enumerated_Domain:

Enumerated_Domain_Value: Tgrf

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: **Volcanic rocks of Gamma Ridge (Pliocene): Altered andesite and dacite flows**—Red to black andesite and dacite, plagioclase-phyric, trachytic; much altered to calcite, chlorite, and zeolites

Enumerated_Domain:

Enumerated_Domain_Value: Tcgg

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: Intrusive rocks of the Cascade Pass family: **Cool Glacier stock (Pliocene): Granodiorite**—Pyroxene-biotite-hornblende granodiorite and quartz monzodiorite. Medium grained, hypidiomorphic granular

Enumerated_Domain:

Enumerated_Domain_Value: Tcgb

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC ARC: Intrusive rocks of the Cascade Pass family: **Cool Glacier stock (Pliocene): Breccia**—Clasts derived from Tenpeak pluton in a hydrothermally altered matrix of highly comminuted tonalite and altered volcanic material and some glass

Enumerated_Domain:

Enumerated_Domain_Value: Tdp

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC
ARC: Intrusive rocks of the Cascade Pass family: **Dacite plugs and dikes (Pliocene)**—Gray, porphyritic biotite-hornblende-hypersthene dacite with locally resorbed quartz phenocrysts. Locally well-developed columnar jointing. Includes dacite breccia northwest of Glacier Peak. Locally includes andesite

Enumerated_Domain:

Enumerated_Domain_Value: Tmbt

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC
ARC: Intrusive rocks of the Cascade Pass family: **Mount Buckindy pluton (Miocene): Tonalite and granodiorite**—Mostly porphyritic biotite-hornblende tonalite to hornblende tonalite porphyry. Rocks are quartz-phyric with hypidiomorphic granular groundmass, but heterogeneous in grain size and texture

Enumerated_Domain:

Enumerated_Domain_Value: Tmbb

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC
ARC: Intrusive rocks of the Cascade Pass family: **Mount Buckindy pluton (Miocene): Breccia**—Clasts of tonalite in a vuggy quartz and iron oxide (magnetite?) matrix

Enumerated_Domain:

Enumerated_Domain_Value: Tdt

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC
ARC: Intrusive rocks of the Cascade Pass family: **Cascade Pass dike (Miocene): Tonalite**—Medium-grained hornblende-biotite tonalite, hypidiomorphic granular with small glomeroporphyrocrysts of mafic minerals. Massive and coarsely jointed, with local areas of disseminated sulfide minerals. The dike has fine-grained, porphyritic, chilled margins; contact lit-par-lit complexes are common, and alteration is pervasive locally

Enumerated_Domain:

Enumerated_Domain_Value: Tdbx

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC
ARC: Intrusive rocks of the Cascade Pass family: **Cascade Pass dike (Miocene): Breccia**—Rotated fragments of altered hornblende schist with minor quartz and calcite or aplitic matrix grading downward into swarms of schist inclusions in a miarolitic tonalite matrix

Enumerated_Domain:

Enumerated_Domain_Value: Tcpl

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC
ARC: Intrusive rocks of the Cascade Pass family: **Cloudy Pass batholith and associated rocks (Miocene): Light-colored granite and granodiorite**—Hornblende-biotite granite and granodiorite, white to pink, medium-grained subhedral plagioclase in a finer grained matrix of xenomorphic granular to granophyric quartz and orthoclase; color index (CI)=5-15, massive, jointed, inclusions rare. Sharp contact with country rocks on west, grades into unit Tcpl on east

Enumerated_Domain:

Enumerated_Domain_Value: Tcpl

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC
ARC: Intrusive rocks of the Cascade Pass family: **Cloudy Pass batholith and associated rocks (Miocene): Dark-colored granodiorite, tonalite, gabbro, and quartz gabbro**—Light- to dark-gray, medium-grained hornblende-biotite granodiorite, gabbro, tonalite, and quartz gabbro, hypidiomorphic granular. CI=10-30. Massive, well-jointed, inclusions rare; locally altered and cataclastic, grades into unit Tcpl and in smaller bodies commonly contains pyroxene and locally abundant mafic inclusions. Varied in texture and composition, locally porphyritic. South of

Lake Byrne forms a complex of dikes, sills, and irregular small masses. At South Cascade Glacier, quartz with necklace inclusions suggests early-formed quartz phenocrysts

Enumerated_Domain:

Enumerated_Domain_Value:Tcpu

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Cascade Pass family: **Cloudy Pass batholith and associated rocks (Miocene): Granodiorite, tonalite, and gabbro, undivided**

Enumerated_Domain:

Enumerated_Domain_Value: Tcpb

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Cascade Pass family: **Cloudy Pass batholith and associated rocks (Miocene): Intrusive breccia**—Chips and large blocks of schist, gneiss, and aphanite in a matrix of dacite which is commonly highly cataclastic; dark aphanite fragments and dacitic matrix commonly trachytic; locally recrystallized by thermal metamorphism

Enumerated_Domain:

Enumerated_Domain_Value: Tcpc

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Cascade Pass family: **Cloudy Pass batholith and associated rocks (Miocene): Clustered light-colored dikes and irregular intrusive bodies**—White, variably fine grained to coarse grained xenomorphic or hypidiomorphic granular tonalite to granite alaskite in densely clustered dikes, sills, and irregular bodies, generally making up 80 percent or more of bedrock. Locally weakly to strongly foliated. Contacts of individual bodies are sharp. Contact of mapped concentration is gradational. Rocks rich in K-feldspar appear to be related to the batholith, but many light-colored rocks may be older associates of the metamorphic country rock

Enumerated_Domain:

Enumerated_Domain_Value: Tdm

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Cascade Pass family: **Downey Mountain stock (Miocene)**—Hornblende-biotite tonalite, locally granodiorite. Similar to unit Tcpu

Enumerated_Domain:

Enumerated_Domain_Value: Tgm

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Snoqualmie family: **Grotto batholith (Oligocene): Monte Cristo stock**—Hornblende-biotite granodiorite and tonalite. Locally contains augite and hypersthene. Commonly somewhat altered to chlorite, epidote, and sphene

Enumerated_Domain:

Enumerated_Domain_Value: Tgd

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Snoqualmie family: **Grotto batholith (Oligocene): Dead Duck pluton**—Hornblende-biotite tonalite and granodiorite, with minor augite and hypersthene

Enumerated_Domain:

Enumerated_Domain_Value: Tst

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Index family: **Squire Creek stock and related intrusive rocks (Oligocene): Tonalite**—Predominantly uniform hornblende-biotite tonalite and granodiorite, medium-grained and hypidiomorphic granular. Locally rich in small hornblende diorite inclusions.

CI=12-18 as reported in Vance (1957a, p. 241-274). Locally in interior, pluton is fine-grained and with lower CI

Enumerated_Domain:

Enumerated_Domain_Value: Tsbt

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Index family: **Squire Creek stock and related intrusive rocks**

(Oligocene): Biotite tonalite—On Vesper Peak mostly medium-grained hypidiomorphic inequigranular; rarely hornblende-biotite tonalite with rare hypersthene. CI=9-28, mostly about 12-20 (Baum, 1968, p. 20)

Enumerated_Domain:

Enumerated_Domain_Value: Tsh

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Index family: **Squire Creek stock and related intrusive rocks**

(Oligocene): Hornblende quartz diorite—At Granite Lake the rocks are a porphyritic hornblende-clinopyroxene quartz diorite with euhedral, highly corroded, pale-brown hornblende phenocrysts. Dikes of a similar but more porphyritic rock-type are common in the Mount Higgins area

Enumerated_Domain:

Enumerated_Domain_Value: Tsst

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Index family: **Squire Creek stock and related intrusive rocks**

(Oligocene): Tonalite of the Shake Creek stock—Biotite-hornblende tonalite, fine-grained, highly altered

Enumerated_Domain:

Enumerated_Domain_Value: Tsrđ

Enumerated_Domain_Value_Definition: ROCKS AND DEPOSITS OF THE CASCADE MAGMATIC

ARC: Intrusive rocks of the Index family: **Sauk ring dike (Oligocene and (or) middle**

Eocene)—Gray dacite and andesite porphyry with abundant plagioclase and rare quartz phenocrysts; highly altered to epidote, chlorite, sericite, albite, and carbonate minerals. At northwest base of Sheep Mountain, rocks are a mixture of holocrystalline hornblende tonalite, dacite, and porphyry, as well as gradational types in between

Enumerated_Domain:

Enumerated_Domain_Value: Trl

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Breccia of**

Round Lake (Miocene)—Predominantly andesite to dacite breccia forming massive cliffs, locally weakly bedded. Rocks are plagioclase phyric, but phenocrysts are highly altered and mafic minerals are replaced by chlorite. Includes some probable hypabyssal holocrystalline pyroxene andesite porphyry

Enumerated_Domain:

Enumerated_Domain_Value: Tus

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK **Unnamed**

sandstone (Oligocene)—Moderately weathered to deeply weathered, sandy pebble conglomerate to very fine grained sandstone. Coarse beds contain a high percentage of quartzose pebbles; finer beds contain considerable mica and lignite. Deeply weathered exposures usually can be distinguished from old glacial outwash by manganese staining on joint planes, quartzose or pebble-rich lithology, and presence of organic matter

Enumerated_Domain:

Enumerated_Domain_Value: Tbv

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Barlow Pass Volcanics of Vance (1957a, b) (late and middle Eocene): Volcanic rocks**—Basaltic andesite, basalt and, rhyolite in flows, breccia, and tuff interbedded with tuffaceous to feldspathic sandstone, conglomerate, and minor argillite. Basalt in the upper part of the section forms dark brown columnar flows. Basaltic andesite occurring lower in section is generally dark-green to gray, aphyric, massive, and dense. Rhyolite occurs as thick flows, typically weathering light-green to white with flow laminations; commonly spherulitic. Volcanic rocks are mostly highly altered to a dense mat of chlorite, epidote, calcite, and sericite; porphyritic and trachytoid textures are relict. Bedding in volcanic rocks is obscure except in some water-laid tuffs

Enumerated_Domain:

Enumerated_Domain_Value: Tbg

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Barlow Pass Volcanics of Vance (1957a, b) (late and middle Eocene): Gabbro**—Medium-grained, ophitic with plagioclase and clinopyroxene. Intrusive into volcanic rocks (Tbv), but affinity uncertain

Enumerated_Domain:

Enumerated_Domain_Value: Tbb

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Barlow Pass Volcanics of Vance (1957a, b) (late and middle Eocene): Basalt**—Clinopyroxene-plagioclase microphyric basalt; in part, amygdaloidal. Cliff-forming columnar flows up to several tens of meters thick

Enumerated_Domain:

Enumerated_Domain_Value: Tbr

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Barlow Pass Volcanics of Vance (1957a, b) (late and middle Eocene): Rhyolite flows and rhyolite ash-flow tuff**—Commonly dark colored, green or black, weathering to light green, gray, white, or orange with sparse microphenocrysts of plagioclase and quartz. Commonly laminated and spherulitic, devitrified or highly altered to montmorillonoids

Enumerated_Domain:

Enumerated_Domain_Value: Tbs

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Barlow Pass Volcanics of Vance (1957a, b) (late and middle Eocene): Sandstone**—Mostly feldspathic subquartzose sandstone and pebble conglomerate with minor interbeds of argillite and siltstone, rarer tuffaceous sandstone, and tuff. Detrital mica and fossil leaves common. Well-bedded. In the area northwest of Darrington, bentonite interbeds are present (Kinder-Cruver, 1981, p. 29), and many sandstone beds are composed of quartz framework grains totally supported in a matrix rich in montmorillonoids probably derived from volcanic glass. Within 1 to 2 km of the Squire Creek stock and related plutons, sandstone and argillite are hornfelsic. Within the Darrington-Devils Mountain Fault Zone, conglomerate clasts are highly stretched

Enumerated_Domain:

Enumerated_Domain_Value: Tbsv

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Barlow Pass Volcanics of Vance (1957a, b) (late and middle Eocene): Sandstone and volcanic rocks**—Sandstone with conspicuous interbeds of basalt and rhyolite

Enumerated_Domain:

Enumerated_Domain_Value: Tgf

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Granite Falls stock and associated plutons (middle Eocene)**—Biotite hornblende granodiorite, mostly

fine grained hypidiomorphic granular, slightly porphyritic. Locally contains hypersthene and small amounts of elbaite (tourmaline). Commonly highly altered. Country rock strongly thermally metamorphosed

Enumerated_Domain:

Enumerated_Domain_Value: Tpg

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Mount**

Pilchuck stock (middle Eocene): Granite and granodiorite—Mostly fine grained, slightly porphyritic, hypidiomorphic granular biotite granite with resorbed quartz phenocrysts. Cl=4-8, locally as much as 40 percent K-feldspar, mostly perthite (Wiebe, 1963, p. 21). Wiebe (1963, p. 24-31) describes accessory cordierite and one occurrence of garnet. Zircon and tourmaline (elbaite) are also common accessories. Rock is massive, has chilled margins, and has thermally metamorphosed the country rock

Enumerated_Domain:

Enumerated_Domain_Value: Thl

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Rhyolite of**

Hanson Lake (middle Eocene)—Dark-colored, glassy to devitrified biotite rhyolite ash-flow tuff. Commonly perlitic, contains sanidine, plagioclase, quartz, and garnet phenocrysts. Poorly exposed near Hanson Lake and to the west where the unit includes quartz- and clinopyroxene-bearing mafic tuff. Northwest of Bosworth Lake, mafic tuff and breccia are highly altered to epidote and smectites

Enumerated_Domain:

Enumerated_Domain_Value: Tfs

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Feldspathic**

sandstone and conglomerate (middle Eocene)—Dark-gray to green, locally red to purple, medium- to coarse-grained feldspathic sandstone, pebble to boulder conglomerate, and minor thin-bedded black argillite. Most coarse clasts are graywacke and greenstone

Enumerated_Domain:

Enumerated_Domain_Value: Tss

Enumerated_Domain_Value_Definition: SEDIMENTARY AND IGNEOUS ROCK: **Sandstone**

associated with the Straight Creek Fault (middle and (or) early Eocene)—Feldspathic sandstone and pebble conglomerate. Mostly highly sheared and locally altered

Enumerated_Domain:

Enumerated_Domain_Value: TKhm

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks in the Darrington-Devils Mountain Fault Zone (DDMFZ): **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Peridotite and serpentinite**

matrix—Metamorphic peridotite and rare metamorphic dunite are orange- and black-weathering resistant rocks occurring mostly as steeply dipping tectonic lenses and sheets in Tertiary sandstone and as isolated blocks in serpentinite. Some relict pyroxene in serpentinite above Swede Heaven suggests original cumulus textures. Serpentinite is generally flaky, gray to green in rare outcrops. On Helena Ridge, serpentinite is lizardite and chrysotile (Vance and Dungan, 1977, p. 1498). In the Iron Mountain-Gee Point area, Brown and others (1982, p. 1089) describe serpentinite composed of antigorite, commonly with well-defined foliation, and relict aluminous chromite, rimmed by Fe-chromite suggesting an alpine peridotite protolith

Enumerated_Domain:

Enumerated_Domain_Value: TKhg

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks in the Darrington-Devils Mountain Fault Zone (DDMFZ): **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Greenstone, foliated greenstone, and greenschist**—Greenstone including basalt with relict clinopyroxene and plagioclase to well-recrystallized actinolitic greenstone, and greenschist, commonly with pumpellyite, prehnite, stilpnomelane, and locally with aragonite in veins. Cruver (1983, p. 23) reports lawsonite in metagraywacke associated with greenstone of his Haystack Mountain unit on strike to the northwest. Outcrops are commonly massive, but on Big and Little Deer Peaks, probable bedding is revealed by broad color bands and contrasting joint patterns when viewed from afar. See Cruver (1983) and Reller (1986) for detailed petrography and chemistry. Includes minor schistose dacite metaporphry, graywacke, and argillite

Enumerated_Domain:

Enumerated_Domain_Value: TKhd

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks in the Darrington-Devils Mountain Fault Zone (DDMFZ): **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Diabase and gabbro**—Uralitic metadiabase and metagabbro, rarely with relict brown hornblende and saussuritic plagioclase, and very rare relict clinopyroxene. Partially to completely altered to actinolite and pumpellyite with pseudomorphous ophitic or subophitic textures. Commonly cut by mylonitic to cataclastic microshears. Commonly weathers out of serpentinite matrix as steep-sided hillocks

Enumerated_Domain:

Enumerated_Domain_Value: TKhs

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks in the Darrington-Devils Mountain Fault Zone (DDMFZ): **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Sedimentary rocks**—Chert, graywacke, phyllitic argillite, and semischist

Enumerated_Domain:

Enumerated_Domain_Value: TKhf

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks in the Darrington-Devils Mountain Fault Zone (DDMFZ): **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Foliated metavolcanic rocks**—Silicic metaporphry and micaceous quartz-feldspar schist, commonly with relict plagioclase phenoclasts. Foliated light-colored greenstone and greenstone. On Helena Ridge, includes considerable foliated greenstone, some with relict pillows. Northwest of Darrington, includes considerable metabasalt with relict plagioclase and clinopyroxene in an altered felty or trachytic matrix

Enumerated_Domain:

Enumerated_Domain_Value: TKha

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks in the Darrington-Devils Mountain Fault Zone (DDMFZ): **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Amphibolite**—Fine-grained amphibolite with well-crystallized green hornblende and plagioclase, partially altered to chlorite, epidote, and pumpellyite(?)

Enumerated_Domain:

Enumerated_Domain_Value: TKht

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks in the Darrington-Devils Mountain Fault Zone (DDMFZ): **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Tonalite**—Medium-grained hypidiomorphic

hornblende tonalite altered to chlorite, prehnite, epidote, and pumpellyite(?). Rocks are locally gneissic and cataclastic, interlayered with amphibolite (TKha) at north contact of tonalite

Enumerated_Domain:

Enumerated_Domain_Value: bmg

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Bald Mountain pluton (age uncertain): Granodiorite and granite**—Medium- to coarse-grained hypidiomorphic biotite granodiorite and granite, in part gneissic near margins. Locally with coarse(1-2 cm) crystals of K-feldspar, accessory cordierite, mostly altered to pinite, and rare garnet. Rock is locally cataclastic. Clinopyroxene rimmed with hornblende; intergranular graphic intergrowths of quartz and K-feldspar

Enumerated_Domain:

Enumerated_Domain_Value: bms

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Bald Mountain pluton (age uncertain): Sill complex**—Multiple sills of granodiorite in hornfelsic argillite and graywacke. Sills, ranging from a few meters to hundreds of meters thick, makes up from 10 to 90 percent of this rock unit

Enumerated_Domain:

Enumerated_Domain_Value: TKws

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the western melange belt (middle Eocene to Late Cretaceous): Semischist, slate, and phyllite**—Mostly pervasively foliated gray to black lithofeldspathic and volcanolithic subquartzose sandstone and semischist. Locally abundant fine- to medium-cobble conglomerate. Commonly interbedded with argillite or phyllite. Locally well developed rhythmite. Where foliation is less well developed, sedimentary features, including graded beds and load casts, are locally well preserved. Metamorphic minerals, which locally replace matrix and framework grains and also occur in veins, are carbonate minerals, prehnite, pumpellyite, chlorite, and sericite. Unit includes rare greenstone derived from mafic volcanic breccia, tuff, and flows. Also includes locally abundant chert

Enumerated_Domain:

Enumerated_Domain_Value: TKwph

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the western melange belt (middle Eocene to Late Cretaceous): Phyllite**—Gray, brown to black phyllite, less abundant semischist, locally abundant chert and rare greenstone. Includes subordinate thin beds of recrystallized sandstone and semischist and rare stretched-pebble conglomerate. Locally with well-developed pencil structures and rarer crinkle lineation. Metamorphic minerals are sericite, carbonate minerals, chlorite, prehnite, and pumpellyite(?). Metasandstone commonly forms small boudins as long as a few meters

Enumerated_Domain:

Enumerated_Domain_Value: TKwv

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the western melange belt (middle Eocene to Late Cretaceous): Volcanic rocks**—Greenstone and sheared greenstone including diabase and gabbro. Poorly exposed south of the Pilchuck River

Enumerated_Domain:

Enumerated_Domain_Value: TKwg

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT: Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the western melange belt (middle Eocene to Late Cretaceous): Gabbro and diorite**—Massive to foliated, fine- to medium-grained metagabbro and metadiorite. Outcrops sheared on all scales. In massive rocks, euhedral, mottled, locally crushed plagioclase, intergranular to euhedral uraltized clinopyroxene and opaque minerals are common. Metamorphic minerals are albite(?), uraltite, chlorite, sphene, and carbonate minerals

Enumerated_Domain:

Enumerated_Domain_Value: TKwu

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT: Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the western melange belt (middle Eocene to Late Cretaceous): Ultramafic rocks**—Serpentinized peridotite and dunite. Nearby Tertiary plutons have recrystallized ultramafic rocks to higher grade assemblages, locally with enstatite and talc

Enumerated_Domain:

Enumerated_Domain_Value: TKt

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT: Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Tafton terrane of Whetten and others (1988) (middle Eocene to Late Cretaceous):** Predominantly greenstone and banded chert with subordinate graywacke and argillite. Commonly highly sheared and mixed on all scales. Greenstone has relict plagioclase and clinopyroxene, but is now mostly chlorite, carbonate minerals, and brownish pumpellyite(?); some rocks with veins of green pumpellyite. Chert is red and black, locally highly recrystallized. Minor diabase. Argillite locally phyllitic

Enumerated_Domain:

Enumerated_Domain_Value: TKtg

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT: Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Tafton terrane of Whetten and others (1988) (middle Eocene to Late Cretaceous): Metagranodiorite**—Medium-grained, hypidiomorphic hornblende-biotite metagranodiorite partially recrystallized to albite, chlorite, prehnite, and pumpellyite

Enumerated_Domain:

Enumerated_Domain_Value: TKev

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT: Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Mafic metavolcanic rocks with mostly subordinate graywacke and foliated graywacke, argillite and phyllitic argillite, chert, and marble**—Highly sheared and disrupted greenstone makes up from 20 to 50 percent of melange and contains relict clinopyroxene (some titaniferous) and plagioclase in an altered matrix of chlorite, carbonate minerals, and pumpellyite. Rare deformed pillows. Locally prehnite in veins. Volcanic subquartzose sandstone similar to sandstone in unit TKwg. Unit symbol in parenthesis (TKev) indicates block or inferred block in Helena-Haystack mélangé

Enumerated_Domain:

Enumerated_Domain_Value: TKea

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT: Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Argillite**—Black, locally foliate argillite with

limy concretions. Poorly exposed south of the town of White Horse. Locally cut by deformed and brecciated metadacite dikes

Enumerated_Domain:

Enumerated_Domain_Value: TKew

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Volcanic rocks of Whitehorse**

Mountain—Plagioclase-phyric pyroxene andesite and basaltic andesite ranging to dacite. Includes minor diabase and gabbro. Most rocks slightly metamorphosed and contain chlorite, pumpellyite, and prehnite. Forms massive cliffs. Amygdaloidal flow tops, breccia, tuff, and thin local sedimentary interbeds

Enumerated_Domain:

Enumerated_Domain_Value: TKec

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Chert**—Mostly white-weathering, red or black ribbon chert and metachert making up to 20 to 80 percent of unit. Uniformly banded to complexly disrupted. Some chert as thin laminae in cherty argillite. Locally abundant greenstone, graywacke, and argillite. Vance (1957a, p. 221-222) reports considerable argillite and sandstone and several conglomerate beds on the west side of Three Fingers

Enumerated_Domain:

Enumerated_Domain_Value: Tkem

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Marble**—Gray to white, locally with chlorite; coarsely crystalline. Danner (1966, p. 326-329) describes the deposits south of White Horse; mostly in small pods

Enumerated_Domain:

Enumerated_Domain_Value: TKegb

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Gabbro**—On the South Fork of the Stillaguamish River, unit consists of gabbro, layered gabbro, and interlayered cumulate ultramafic rocks (wehrlite) (Dungan, 1974, p. 46-53). Includes some metatonalite and gneissic amphibolite. The large gabbro body mapped within the Helena-Haystack melange south of Darrington is medium grained and massive but laced with swarms of diabase dikes (Vance and others, 1980, p. 365). Gabbros are generally partially altered to albite, actinolite, epidote, and chlorite. Unit symbol in parenthesis (TKegb) indicates block or inferred block in Helena-Haystack mélangé

Enumerated_Domain:

Enumerated_Domain_Value: Tket

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Zone of tectonized meta-igneous pods**—Disrupted argillite, chert, and greenstone with abundant pods of tectonized metatonalite and metagabbro

Enumerated_Domain:

Enumerated_Domain_Value: TKeu

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks southwest of the Darrington-Devils Mountain Fault Zone: **Rocks of the eastern melange belt (middle Eocene to Late Cretaceous): Ultramafic rocks**—Serpentinite, metaperidotite, and metaclinopyroxenite. Dungan (1974, p. 48-53, 94) describes some ultramafic blocks with primary cumulus textures and others as harzburgite and dunite tectonite. Metamorphic minerals, mostly confined to rocks north of the South Fork of the Stillaguamish River are tremolite, talc, and olivine

Enumerated_Domain:

Enumerated_Domain_Value: MzPzg

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Gabbroic intrusions (Mesozoic and Paleozoic)**—Mostly metagabbro and metadiabase. Fine- to medium-grained granular or ophitic saussuritized plagioclase in fibrous matrix of green amphibole, chlorite, and epidote minerals. Grains are crushed, locally microbrecciated. Includes cataclastic tonalite northeast of Rockport

Enumerated_Domain:

Enumerated_Domain_Value: Kes

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Easton Metamorphic Suite: Shuksan Greenschist (Early Cretaceous)**—Predominantly fine-grained greenschist, sodic actinolite-bearing greenschist, and (or) blueschist. Locally includes quartzitic greenschist, iron- and manganese-rich quartzite (metachert), greenstone, and graphitic phyllite. Rare relict clinopyroxene in some greenschist. Common also is leucogreenschist, generally with pumpellyite, characterized by a mosaic of albite porphyroblasts that have mineral inclusions aligned in the foliation. Common are epidote clots or balls, generally less than 1mm in diameter, and probably derived from vesicle fillings in the protolith basalt (Misch 1965; Haugerud, 1980, p. 39-44). Schists are commonly conspicuously layered on centimeter scale, and foliation and layering are tightly folded on outcrop scale. Locally interlayered with units Ked and Keds. Unit symbol in parenthesis (Kes) indicates block or inferred block in Helena-Haystack mélange

Enumerated_Domain:

Enumerated_Domain_Value: Keg

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Easton Metamorphic Suite: Garnet amphibolite (Early Cretaceous)**—Garnet amphibolite and muscovite-quartz schist, barroisite schist, hornblende-garnet rocks, and rare eclogite commonly surrounded by greenschist. Most of these rocks are coarser grained than typical Shuksan lithologies. The garnet amphibolite is overprinted by blueschist-facies metamorphism (Brown and others, 1982). Includes minor ultramafic rocks. Unit symbol in parenthesis (Keg) indicates block or inferred block in Helena-Haystack mélange

Enumerated_Domain:

Enumerated_Domain_Value: Ked

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:
Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Easton Metamorphic Suite: Darrington Phyllite (Early Cretaceous)**—Predominantly black, highly fissile sericite-graphite-albite-quartz phyllite, typically with abundant quartz veinlets; commonly complexly folded. Most phyllite has a strong crinkle lineation. Some well-foliated metasandstone. Locally interlayered with unit Kes

Enumerated_Domain:

Enumerated_Domain_Value: Keds

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*:

Easton Metamorphic Suite: Darrington Phyllite (Early Cretaceous): Silver-colored

phyllite—Predominantly fine-grained muscovite-rich phyllite or schist, commonly with lawsonite, locally with graphite and garnet. Some rocks with albite porphyroblasts. Dazzling bright in sunlight. Locally interlayered with unit Kes. Unit symbol in parenthesis (Keds) indicates block or inferred block in Helena-Haystack mélange

Enumerated_Domain:

Enumerated_Domain_Value: Kem

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*:

Easton Metamorphic Suite: Mixed greenschist and phyllite (Early

Cretaceous)—Interlayered greenschist and black phyllite on a 1- to 10-m scale

Enumerated_Domain:

Enumerated_Domain_Value: Kems

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*:

Easton Metamorphic Suite: Mixed greenschist and phyllite (Early Cretaceous):

Mixed greenschist and silver-colored phyllite

Enumerated_Domain:

Enumerated_Domain_Value: Keu

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*:

Easton Metamorphic Suite: Ultramafic rocks (Early Cretaceous)—Mostly serpentinite.

Occurs in unit Keds and near faulted contacts with unit TKhm

Enumerated_Domain:

Enumerated_Domain_Value: Krs

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Slate**

of Rinker Ridge (Early Cretaceous and Late Jurassic)—Predominantly gray to brown, little-recrystallized slate and phyllite with local foliated sandstone and semischist

Enumerated_Domain:

Enumerated_Domain_Value: Kjb

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Bell**

Pass melange (Early Cretaceous and Late Jurassic)—Metagabbro, metadiorite, metatonalite, silicic gneiss, fine-grained epidote amphibolite gneiss, micaceous quartzite, amphibole schist, and ultramafic rocks. Lesser amounts of phyllitic argillite, cherty phyllite, chert, graywacke, semischist, metavolcanic rocks, and marble. Rocks highly variable, commonly mylonitic and (or) cataclastic

Enumerated_Domain:

Enumerated_Domain_Value: byan

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Bell**

Pass melange (Early Cretaceous and Late Jurassic): Yellow Aster Complex of Misch (1966)—Medium- to coarse-grained silicic and feldspathic gneisses and associated weakly

deformed plutonic rocks. See text for discussion of age: **Non-gneissic rocks**—Mostly metagabbro, metadiabase, and metatonalite with minor gneissic igneous rocks

Enumerated_Domain:

Enumerated_Domain_Value: byag

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Bell Pass melange (Early Cretaceous and Late Jurassic): Yellow Aster Complex of Misch (1966): Gneissic rocks**—Siliceous gneiss, pyroxene gneiss, and associated metagabbro, metadiabase, and metatonalite. Includes areas lacking siliceous gneiss but including meta-igneous rocks with strongly mylonitic quartz bands

Enumerated_Domain:

Enumerated_Domain_Value: bc

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Bell Pass melange (Early Cretaceous and Late Jurassic): Chert**—Ribbon chert in large block north of White Chuck River

Enumerated_Domain:

Enumerated_Domain_Value: PDcs

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Chilliwack Group of Cairnes (1944) (Permian to Devonian): Sedimentary rocks**—Well-bedded, gray to brown and black argillite and volcanic subquartzose sandstone with minor pebble conglomerate and rare chert. Includes some volcanic rocks locally. Graded beds, scour structures, and load casts locally prominent; some rhythmite. Locally, sandstone beds strongly disrupted in argillite matrix. Rocks grade rapidly from little deformed to phyllitic with a pronounced foliation generally subparallel to bedding

Enumerated_Domain:

Enumerated_Domain_Value: PDcv

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Chilliwack Group of Cairnes (1944) (Permian to Devonian): Volcanic and metavolcanic rocks**—Mostly greenstone, with subordinate meta-andesite and rare metadacite or metarhyolite. Breccia and tuff predominate. Mafic metavolcanic rocks commonly with relict plagioclase and clinopyroxene in a chlorite-epidote matrix, commonly with carbonate minerals. Plagioclase is mostly recrystallized as albite. Includes some gabbro and diabase

Enumerated_Domain:

Enumerated_Domain_Value: PDcl

Enumerated_Domain_Value_Definition: ROCKS WEST OF THE STRAIGHT CREEK FAULT:

Rocks northeast of the Darrington-Devils Mountain Fault Zone: *Northwest Cascades System*: **Chilliwack Group of Cairnes (1944) (Permian to Devonian): Limestone and marble**—Mostly coarsely crystalline, gray to black. Carbonate rocks in small isolated pods and blocks; locally fossiliferous

Enumerated_Domain:

Enumerated_Domain_Value: Kbl

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Tonalitic gneiss of Bench Lake (Late Cretaceous)**—Mostly light colored, fine grained heterogeneous biotite tonalitic gneiss, locally with hornblende. Subhedral clinozoisite associated with mafic minerals. Cl=3-19, mostly about 9-

12. Layers and pods of finer grained biotite gneiss, garnet biotite-hornblende schist, and amphibolite locally making up 5-10 percent of rock. Mafic schlieren may be swirled. Cut by light-colored tonalite, pegmatite, and aplite dikes. Contact with unit Kblg is gradational

Enumerated_Domain:

Enumerated_Domain_Value: Kblg

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Tonalitic gneiss of Bench Lake (Late Cretaceous): Banded tonalitic gneiss**—Strongly layered fine-grained biotite-hornblende gneiss and light-colored biotite tonalite to granodioritic gneiss, As mapped, commonly contains garnet and thin and thick layers and pods of Napeequa Schist (Kns), especially hornblende schist and schistose hornblendite as well as some ultramafic rocks (Knu). Layers pinch and swell. Rocks are cut by many irregular pegmatite and aplite dikes and have a migmatitic aspect. Gneiss layers are crystalloblastic gneissose to granoblastic with heterogeneous grain size. Some biotite gneiss layers have subidioblastic to porphyroblastic plagioclase with faint relict euhedral zoning suggesting an igneous origin

Enumerated_Domain:

Enumerated_Domain_Value: Kng

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Nason Ridge Migmatitic Gneiss (Late Cretaceous)**—In south, mostly heterogeneous light-colored tonalite to granodioritic gneiss interlayered with mica schist and amphibolite similar to the Chiwaukum Schist. Predominantly crystalloblastic. Most common lithology is medium-grained biotite gneiss with a slightly porphyroblastic appearance due to anastomosing mica layers surrounding larger plagioclase crystals or aggregate grains. Contacts between gneiss and schist are both sharp and gradational along and across strike. Cross-cutting sills, dikes, and irregular bodies of light-colored fine-grained to pegmatitic tonalite and gneiss are also abundant in migmatitic phases. Most of unit has 50 percent or more light-colored gneiss. Grades northward into more uniform, mostly medium grained garnet-biotite-quartz-oligoclase (or andesine) gneiss which is difficult to distinguish from Chiwaukum Schist. Rare rounded relict kyanite and sillimanite occur within sericite knots

Enumerated_Domain:

Enumerated_Domain_Value: Ksc

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Sloan Creek plutons (Late Cretaceous)**—Biotite-hornblende tonalitic gneiss, flaser gneiss, and local gneissic metatonalite; medium grained, homogeneous, crystalloblastic gneissose to strongly flaseroid; locally strongly mylonitic. $CI=0-37$, but for most rocks $CI=20-30$ (Ford and others, 1988, p. 71). Locally contains garnet. Plagioclase normally zoned or unzoned and strongly stress twinned but with relict patchy zoning and faint oscillatory zoning and synneusis twins (Heath, 1971, p. 62). Retrogressive alteration is pronounced but somewhat sporadic; epidote minerals and sericite commonly fill plagioclase cores; mafic minerals are altered to chlorite, sphene, and prehnite. As mapped, includes some interlayered flaser gneiss and Nason Ridge Migmatitic Gneiss (Kng)

Enumerated_Domain:

Enumerated_Domain_Value: Ktc

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Tenpeak pluton (Late Cretaceous): Contact zone**—Dark-colored biotite-hornblende metatonalite and tonalitic gneiss, hornblende diorite, and hornblendite, locally with garnet; layers of garnet-hornblende-biotite schist increase to west. Pods of hornblendite and ultramafic rocks (R. A. Haugerud, written comm. 1993) suggest that much of

of the country rock in this zone may be the Napeequa Schist. This description and others of the Tenpeak pluton adapted from Crowder and others (1966)

Enumerated_Domain:

Enumerated_Domain_Value: Ktd

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Tenpeak pluton (Late Cretaceous): Dark-**

colored metatonalite and tonalitic gneiss—Medium-grained biotite-hornblende metadiorite and metatonalite. Xenoblastic to granoblastic with rare broken faintly oscillatory-zoned sodic andesine, commonly in a dark mesh of hornblende and biotite. CI=20-50. Rich in mafic lenses and streaks and hornblende inclusions. Grades into unit Kti

Enumerated_Domain:

Enumerated_Domain_Value: Ktm

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Tenpeak pluton (Late Cretaceous):**

Metatonalite and tonalitic gneiss—Light-colored medium-grained hornblende-biotite tonalite and tonalitic gneiss. Xenoblastic to hypidiomorphic, commonly with aligned euhedral hornblende prisms, locally as long as 1 cm. CI=15-20, locally as much as 40. Subhedral epidote and pseudomymekitic epidote common. Allanite and garnet occur on west margin of unit.

Hornblende commonly zoned from brownish green to bluish green on rims. Sodic andesine crystals commonly broken and with faint euhedral oscillatory zoning

Enumerated_Domain:

Enumerated_Domain_Value: Kti

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Tenpeak pluton (Late Cretaceous):**

Interlayered rocks—Light- and dark-colored biotite-hornblende dioritic gneiss, tonalitic gneiss and flaser gneiss, and subordinate hornblende schist

Enumerated_Domain:

Enumerated_Domain_Value: Ktf

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Tenpeak pluton (Late Cretaceous): Flaser gneiss**—Medium-grained hornblende and (or) biotite tonalite flaser gneiss; textures are xenoblastic, porphyroclastic, and mylonitic. CI=20-40

Enumerated_Domain:

Enumerated_Domain_Value: Kchb

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Chaval pluton (Late Cretaceous): Biotite-**

hornblende quartz diorite and diorite—Mostly medium grained biotite-hornblende quartz diorite, locally diorite or tonalite, with clinopyroxene and hypersthene locally and accessory iron-titanium oxide, allanite, zircon, and apatite. Textures are mostly igneous but near the margins become subidioblastic with little or no relict igneous texture except for rare euhedral oscillatory-zoned plagioclase. Margins of main pluton are gneissic and minerals are mylonitized and recrystallized. Flaser gneiss common. Metamorphic minerals are epidote, blue-green hornblende (commonly with cores of brown igneous(?) hornblende, biotite, and garnet). Some euhedrally zoned epidote. Descriptions modified from Boak (1977, p. 32-55)

Enumerated_Domain:

Enumerated_Domain_Value: Kchm

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Chaval pluton (Late Cretaceous): Mafic**

hornblende metadiorite, metaquartz diorite, and mafic amphibolite—Heterogeneous, layered rocks with zones of unit Kchb and country rocks. Commonly rich in pegmatite and light-colored tonalite in sharply bounded dikes or irregular bodies with swirled, gradational contacts

Enumerated_Domain:

Enumerated_Domain_Value: Kchs

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Chaval pluton (Late Cretaceous): Sills and dikes**—Sills and dikes composed of mafic metadiorite and metaquartz diorite intrusive into the Chiwaukum Schist. Many layers of amphibolite. Sharply banded, tabular bodies of mafic rocks, similar to unit Kchm

Enumerated_Domain:

Enumerated_Domain_Value: Kgp

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Grassy Point stock (Late Cretaceous)**—Light-colored, medium- to coarse-grained biotite metatonalite to rare metagranodiorite with CI=5-50. Mostly uniform granitoid rocks with gneissic margins and rare rhythmic mafic layering. Hypidiomorphic granular with highly strained crystals and strong cataclasis. Rare relict euhedral oscillatory zoned oligoclase-andesine

Enumerated_Domain:

Enumerated_Domain_Value: Kdm

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the tonalitic group*: **Metadiorite (Late Cretaceous)**—West of Lake Byrne [67] fine- to medium-grained hornblende and biotite-hornblende metadiorite and dioritic gneiss with CI=20-30. Xenoblastic to granoblastic with epidote-filled andesine, epidote, allanite, and garnet. Description adapted from Crowder and others (1966)

Enumerated_Domain:

Enumerated_Domain_Value: TKeb

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Eldorado Orthogneiss (middle Eocene to Late Cretaceous): Biotite-hornblende quartz monzodioritic gneiss**—Medium-grained subidioblastic to idioblastic sodic plagioclase with matrix of crystalloblastic to cataclastic quartz, K-feldspar, hornblende, biotite, and epidote; accessory sphene, apatite, zircon, and opaque oxides; commonly well aligned prismatic aggregates of hornblende and biotite, but in many rocks mafic minerals are aligned in a streaky planar fabric. Gradational over several hundred meters into unit Kef. Rock is granodiorite chemically, but $\delta^{18}\text{O}$ is less than 10 (Ford and others, 1988, p. 26; White and others, 1988, p. 30), a characteristic of the tonalitic group

Enumerated_Domain:

Enumerated_Domain_Value: TKef

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Eldorado Orthogneiss (middle Eocene to Late Cretaceous): Flaser gneiss**—Fine- to medium-grained biotite-hornblende metagranodiorite and meta-quartz monzodiorite flaser gneiss, with mosaic sodic plagioclase patches and rare simple crystals set in a finer grained mylonitic matrix of quartz, plagioclase, and mafic minerals

Enumerated_Domain:

Enumerated_Domain_Value: TKhl

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Hidden Lake stock (middle Eocene to**

Late Cretaceous)—Biotite metatonalite, based on modes, but rocks are granodiorite based on CIPW norms and $d^{18}O$ values greater than 10 (Ford and others, 1988, p. 26; White and others, 1988, p. 30). Relict hypidiomorphic granular texture with plagioclase mostly filled with well-crystallized epidote and muscovite; some crushed grain margins have recrystallized, and quartz is sutured. Some K-feldspar is microcline. Rocks are massive and sharply intrusive

Enumerated_Domain:

Enumerated_Domain_Value: Kcl

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Cyclone Lake pluton (Late**

Cretaceous)—Light-colored, fine- to medium-grained, muscovite-biotite metagranodiorite (meta-alaskite). Subhedral sodic plagioclase with relict euhedral oscillatory zoning in a matrix of quartz and microcline, locally blastomylonitic along foliation planes with sparse muscovite and biotite. Common myrmekite. Minor subhedral clinozoisite with rare allanite cores associated with micas. C.I. = 3-7 (Ford and others, 1988, p. 53). Faintly gneissic in outcrop. Rocks become coarser grained and more gneissic towards north margin of pluton where they grade abruptly into the Jordan Lakes pluton

Enumerated_Domain:

Enumerated_Domain_Value: Kjl

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Jordan Lakes pluton (Late**

Cretaceous)—Medium-grained hornblende-biotite tonalite and granodiorite. Hypidiomorphic granular with euhedral to subhedral plagioclase with relict euhedral oscillatory zoning and locally filled with clinozoisite and muscovite and in a mesostasis of microcline or perthite. Myrmekite common. Cl=5-21, generally 10-17

Enumerated_Domain:

Enumerated_Domain_Value: Kdc

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Downey Creek sill complex (Late**

Cretaceous)—Mostly light colored muscovite-biotite metagranodiorite and granodioritic gneiss, locally metatonalite. Cl=3-6 (Ford and others, 1988, p. 59). Crystalloblastic to porphyroblastic with insets of larger plagioclase in granofelsic, foliated matrix of quartz, oligoclase, K-feldspar including microcline, mica, garnet, epidote, and sphene. Ellipsoidal quartz mosaic aggregates suggest former quartz phenocrysts in some rocks. Some plagioclase with faint relict euhedral oscillatory zoning. Occurs mostly as sills and irregular masses into the Napeequa Schist (Kns) with intrusive contacts and metaprophy apophyses. Schist inclusions in the pluton range from 10-70 percent. Includes small lenses in Milk Creek, along Canyon Creek, and a large sill in upper Sulphur Creek that have similar petrographic features

Enumerated_Domain:

Enumerated_Domain_Value: Ksmm

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Sulphur Mountain pluton (Late**

Cretaceous): Metagranodiorite and metatonalite—Medium-grained hornblende-biotite metagranodiorite and metatonalite characterized by large clinopyroxene prisms as long as 8 cm and quartz augen as large as 1.4 cm with accessory subhedral clinozoisite. Textures are xenoblastic to hypidiomorphic. Sphene and rare garnet and allanite. Calcic oligoclase commonly has faint euhedral oscillatory zoning but is also highly filled with epidote. Cl=5-19, mostly about 10-13

Enumerated_Domain:

Enumerated_Domain_Value: Ksmf

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Sulphur Mountain pluton (Late Cretaceous): Flaser gneiss**—On east side of pluton, flaser gneiss consists of medium-grained hornblende-biotite tonalite flaser gneiss with layers and inclusions of clinopyroxene-hornblende schist, hornblende gneiss, biotite gneiss, and quartzite. On west side, unit is hornblende-biotite metatonalite and tonalite flaser gneiss with layers of hornblende and hornblende schist (Crowder and others, 1966)

Enumerated_Domain:

Enumerated_Domain_Value: Kfc

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Stitching units: *Plutons of the granodioritic group*: **Foam Creek stock (Late Cretaceous)**—Medium-grained biotite metagranodiorite with distinctive decussate biotite books. Cl=10-15, rarely 25 (Ford and others, 1988, p. 17). Hypidiomorphic granular with faint relict oscillatory zoned oligoclase-andesine. Commonly retrogressively altered. Margins are highly gneissic

Enumerated_Domain:

Enumerated_Domain_Value: Kca

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Nason terrane: **Chiwaukum Schist (Late Cretaceous): Biotite schist and amphibolite**—Mostly fine grained to medium grained, well-laminated graphitic garnet-biotite-quartz-oligoclase (or andesine) schist, locally with cordierite, andalusite, staurolite, or kyanite and rarely with sillimanite. Abundant schistose amphibolite, fine-grained hornblende gneiss, hornblende-biotite schist, and less common calc-silicate schist and marble. Cut by dikes and sills of light-colored biotite tonalite and pegmatite. Grades into unit Kcgg

Enumerated_Domain:

Enumerated_Domain_Value: Kcm

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Nason terrane: **Chiwaukum Schist (Late Cretaceous): Marble**—Thin to thick layers of coarsely crystalline white to gray marble, commonly with thin schist interbeds and associated calc-silicate schist

Enumerated_Domain:

Enumerated_Domain_Value: Kch

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Nason terrane: **Chiwaukum Schist (Late Cretaceous): Hornblende schist and amphibolite**—Black to light-green, fine- to medium-grained garnet-hornblende-quartz-plagioclase schist, gneiss, and amphibolite. Lepidoblastic to granofelsic, rarely garbenschiefer, with pods or layers rich in biotite, clinopyroxene, and (or) epidote

Enumerated_Domain:

Enumerated_Domain_Value: Kcgg

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Nason terrane: **Chiwaukum Schist (Late Cretaceous): Garnet-graphite-mica schist**—Predominantly very fine grained garnet-graphite-biotite-oligoclase (or andesine)-quartz schist with kyanite and (or) staurolite

Enumerated_Domain:

Enumerated_Domain_Value: TKcs

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: *Rocks northeast of the Entiat Fault*: **Cascade River Schist (Tertiary**

and Late Cretaceous): Mica schist and amphibolite—Mostly fine grained, highly fissile, green, brown, and black micaceous schist ranging from phyllitic sericite-quartz schist to granoblastic biotite- and muscovite-biotite-quartz-albite (or oligoclase) schist and fine-grained paragneiss. Many rocks have garnet; less commonly staurolite and kyanite. Rare chloritoid. Many rocks have blue-green tourmaline. Hornblende-biotite-andesine schist, garbenschiefer, and fine-grained amphibolite common. Calcareous mica schist locally. Hornblende is commonly blue-green. Relict clastic textures common in metasandstone; unit includes small-pebble metaconglomerate. Most descriptions abstracted from Tabor (1961, p. 81-115). On Spider Mountain, unit includes phyllitic quartz-rich schist, calcareous mica schist, grading to impure marble, and silicic metaporphry

Enumerated_Domain:

Enumerated_Domain_Value: Kcc

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks southwest of the Entiat Fault: **Cascade River Schist (Late Cretaceous): Metaconglomerate and plagioclase-rich mica schist**—Gray to dark-green rocks ranging from boulder conglomerate with weak foliation to highly schistose rocks in which pebble clasts are so highly attenuated that they are only visible on surfaces cut perpendicular to lineation. Identifiable protoliths of clasts are quartzite, volcanic rocks, and granitoid rocks. Unmapped granule conglomerate rich in granitoid and metaquartzite clasts occurs elsewhere in the Cascade River Schist south of the North Fork of the Cascade River

Enumerated_Domain:

Enumerated_Domain_Value: TKcc

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks northeast of the Entiat Fault: **Cascade River Schist (Tertiary and Late Cretaceous): Metaconglomerate and plagioclase-rich mica schist**—Gray to dark-green rocks ranging from boulder conglomerate with weak foliation to highly schistose rocks in which pebble clasts are so highly attenuated that they are only visible on surfaces cut perpendicular to lineation. Identifiable protoliths of clasts are quartzite, volcanic rocks, and granitoid rocks. Unmapped granule conglomerate rich in granitoid and metaquartzite clasts occurs elsewhere in the Cascade River Schist south of the North Fork of the Cascade River

Enumerated_Domain:

Enumerated_Domain_Value: Kcmv

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks southwest of the Entiat Fault: **Cascade River Schist (Tertiary and Late Cretaceous): Metavolcanic rocks (Late Cretaceous)**—Fine-grained leucogreenschists, commonly with relict highly flattened phenocrysts of plagioclase or mafic minerals

Enumerated_Domain:

Enumerated_Domain_Value: Kmd

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks southwest of the Entiat Fault: **Marblemount pluton (Cretaceous): Meta-quartz diorite**—Hornblende meta-quartz diorite, metatonalite, and tonalitic gneiss; minor metadiorite, hornblendite, and schistose hornblendite. Light-colored metatonalite dikes. Most common rock type has CI =16-54 (Ford and others, 1988, p. 96). West of the Entiat Fault and in the South Fork of the Cascade River area, the rocks are medium grained, pale green, containing numerous anastomosing shears rich in chlorite, epidote, and actinolitic hornblende, and vary from massive with relict hypidiomorphic granular texture to highly foliate and mylonitic. Sodic plagioclase commonly unzoned, complexly twinned and filled with epidote and

(or) white mica. East of the Cascade River South Fork, rocks are progressively more recrystallized to the southeast with pronounced metamorphic segregation, well-recrystallized blue-green hornblende, and local biotite

Enumerated_Domain:

Enumerated_Domain_Value: TKmd

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks northeast of the Entiat Fault: **Marblemount pluton (Tertiary and Late Cretaceous): Meta-quartz diorite**—Hornblende meta-quartz diorite, metatonalite, and tonalitic gneiss; minor metadiorite, hornblendite, and schistose hornblendite. Light-colored metatonalite dikes. Most common rock type has CI=16-54 (Ford and others, 1988, p. 96). West of the Entiat Fault and in the South Fork of the Cascade River area, the rocks are medium grained, pale green, containing numerous anastomosing shears rich in chlorite, epidote, and actinolitic hornblende, and vary from massive with relict hypidiomorphic granular texture to highly foliate and mylonitic. Sodic plagioclase commonly unzoned, complexly twinned and filled with epidote and (or) white mica. East of the Cascade River South Fork, rocks are progressively more recrystallized to the southeast with pronounced metamorphic segregation, well-recrystallized blue-green hornblende, and local biotite

Enumerated_Domain:

Enumerated_Domain_Value: Kmf

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks southwest of the Entiat Fault: **Marblemount pluton (Late Cretaceous): Flaser gneiss**—Dark-colored epidote-chlorite-muscovite-quartz- plagioclase flaser gneiss, locally with chlorite schist. Subhedral to subidioblastic sodic plagioclase in a foliate matrix, locally with biotite

Enumerated_Domain:

Enumerated_Domain_Value: TKmf

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks northeast of the Entiat Fault: **Marblemount pluton (Tertiary and Late Cretaceous): Flaser gneiss**—Dark-colored epidote-chlorite-muscovite-quartz-plagioclase flaser gneiss, locally with chlorite schist. Subhedral to subidioblastic sodic plagioclase in a foliate matrix, locally with biotite

Enumerated_Domain:

Enumerated_Domain_Value: TKmm

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:

Chelan Mountains terrane: Rocks northeast of the Entiat Fault: **Magic Mountain Gneiss (Tertiary and Late Cretaceous)**—Light-colored chlorite-muscovite-epidote-plagioclase gneiss or flaser gneiss interlayered with chlorite-epidote-quartz-albite schist, locally with garnet and hornblende. Plagioclase, strikingly filled with epidote, is mostly albite and oligoclase; epidote is strongly zoned, mostly to iron-rich rims; chlorite is typically Mg rich. The gneiss layers range from flaseroid with epidote-filled plagioclase insets in a blastomylonitic quartz matrix to strongly layered quartz and albite rocks with numerous stringers of epidote and chlorite. Gneiss layers and greenschist layers are most commonly separated, but gradations occur. Scale of layering ranges from 5 cm to 6 m, but near the contact with the Cascade River Schist, greenschist layers increase in thickness and may be as thick as 60 m. Locally this contact is marked by a monolithologic breccia of equidimensional light-colored gneiss clasts, commonly augen shaped and as large as 10 cm in a greenschist matrix. Descriptions abstracted from Tabor (1961)

Enumerated_Domain:

Enumerated_Domain_Value: TKns

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:
Chelan Mountains terrane: Rocks northeast of the Entiat Fault: **Napeequa Schist (Tertiary and Late Cretaceous): Mica-quartz schist and hornblende schist**—Predominantly fine grained, mica-quartz schist, hornblende schist, amphibolite, hornblende-mica schist, garnet-biotite schist and minor hornblende-zoisite schist, hornblende garbenschiefer, calc-silicate schist, marble, and ultramafic rock. In the Cascade River area and in the Straight Creek Fault Zone, phyllitic muscovite-chlorite-quartz schist predominates. Rocks are mostly white, tan, brown to black, locally greenish with conspicuous compositional banding. Fine lamellar foliation, locally blastomylonitic. Evenly spaced quartz-rich layers, 1-10 cm thick, in mica-quartz schist suggest relict chert bedding, especially prominent north of Illabot Creek and locally along Downey Creek. On outcrop scale the schist is isoclinally folded, commonly crenulated or contorted; small crinkle folds on prominent S-surfaces

Enumerated_Domain:

Enumerated_Domain_Value: Kns

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:
Chelan Mountains terrane: Rocks southwest of the Entiat Fault: **Napeequa Schist (Late Cretaceous): Mica-quartz schist and hornblende schist**—Predominantly fine grained, mica-quartz schist, hornblende schist, amphibolite, hornblende-mica schist, garnet-biotite schist and minor hornblende-zoisite schist, hornblende garbenschiefer, calc-silicate schist, marble, and ultramafic rock. In the Cascade River area and in the Straight Creek Fault Zone, phyllitic muscovite-chlorite-quartz schist predominates. Rocks are mostly white, tan, brown to black, locally greenish with conspicuous compositional banding. Fine lamellar foliation, locally blastomylonitic. Evenly spaced quartz-rich layers, 1-10 cm thick, in mica-quartz schist suggest relict chert bedding, especially prominent north of Illabot Creek and locally along Downey Creek. On outcrop scale the schist is isoclinally folded, commonly crenulated or contorted; small crinkle folds on prominent S-surfaces

Enumerated_Domain:

Enumerated_Domain_Value: Knm

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:
Chelan Mountains terrane: Rocks southwest of the Entiat Fault: **Napeequa Schist (Tertiary and Late Cretaceous): Marble**—Coarsely crystalline white marble grading into calcareous schist and locally calc-silicate schist

Enumerated_Domain:

Enumerated_Domain_Value: Knu

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:
Chelan Mountains terrane: Rocks southwest of the Entiat Fault: **Napeequa Schist (Tertiary and Late Cretaceous): Ultramafic rocks**—Thick, large layers along Downey Creek are mostly metadunite (Grant, 1966, p. 110). Other bodies are serpentized metadunite and metaperidotite. Rocks are dark green to black on fresh surfaces, weathering rusty orange to brown with relics of olivine in a felted mat of antigorite, talc, and tremolite (Crowder and others, 1966). The large body on Jordan Creek is mostly serpentized peridotite (Bryant, 1955, p. 51-53). Many small pods of talc-tremolite schist are unmapped

Enumerated_Domain:

Enumerated_Domain_Value: Ksg

Enumerated_Domain_Value_Definition: ROCKS EAST OF THE STRAIGHT CREEK FAULT:
Swakane terrane: **Swakane Biotite Gneiss (Late Cretaceous)**—Biotite-quartz-oligoclase gneiss, medium-grained, locally with garnet. Generally granofelsic to schistose but remarkably

uniform and unlayered. Foliation folded on a small scale and swirled locally. Rare layers of hornblende schist. Cut by numerous sills and dikes of light-colored tonalite and tonalitic gneiss

Enumerated_Domain:

Enumerated_Domain_Value: wa

Enumerated_Domain_Value_Definition: water

Enumerated_Domain:

Enumerated_Domain_Value: gl

Enumerated_Domain_Value_Definition: glacier

Spatial_Data_Organization_Information: **srlines**

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

Point_and_Vector_Object_Count: 0

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 122

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 28

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Transverse Mercator

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -123.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abcissa_Resolution: 0.000128

Ordinate_Resolution: 0.000128

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: D_Clarke_1866

Ellipsoid_Name: Clarke 1866

Semi-major_Axis: 6378206.400000

Denominator_of_Flattening_Ratio: 294.978698

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: srlines.aat

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: FNODE#

Attribute_Definition: Internal node number for the beginning of an arc (from-node).

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: TNODE#

Attribute_Definition: Internal node number for the end of an arc (to-node).

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: LPOLY#

Attribute_Definition: Internal node number for the left polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: RPOLY#

Attribute_Definition: Internal node number for the right polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: LENGTH

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SRLINES#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRLINES-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LTYPE

Attribute_Definition: locations of fold axis, isograd, topographic escarpment and cross-section
line

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: f.a., fold axis, certain

Enumerated_Domain_Value_Definition: Axial trace of fold based on strike and dip of
bedding.

Enumerated_Domain:

Enumerated_Domain_Value: f.a., fold axis, concealed

Enumerated_Domain_Value_Definition: Axial trace of fold based on strike and dip of
bedding, where beds defining fold are hidden beneath younger unfolded materials

Enumerated_Domain:

Enumerated_Domain_Value: isograd

Enumerated_Domain_Value_Definition: Mineral isograd

Enumerated_Domain:

Enumerated_Domain_Value: topographic, escarpment

Enumerated_Domain_Value_Definition: River-cut terrace boundary

Enumerated_Domain:

Enumerated_Domain_Value: xsect

Enumerated_Domain_Value_Definition: Location of cross-sections on printed map.

Spatial_Data_Organization_Information: **srfoldsyb**

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

Point_and_Vector_Object_Count: 17

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 0

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 37

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Transverse Mercator

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -123.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000
False_Northing: 0.000000
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 0.000128
Ordinate_Resolution: 0.000128
Planar_Distance_Units: meters
Geodetic_Model:
Horizontal_Datum_Name: D_Clarke_1866
Ellipsoid_Name: Clarke 1866
Semi-major_Axis: 6378206.400000
Denominator_of_Flattening_Ratio: 294.978698
Entity_and_Attribute_Information:
Detailed_Description:
Entity_Type:
Entity_Type_Label: srfoldsymb.pat
Attribute:
Attribute_Label: FID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.
Attribute:
Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.
Attribute:
Attribute_Label: AREA
Attribute_Definition: Area of feature in internal units squared.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Area is always zero for point coverages. Values are automatically generated.
Attribute:
Attribute_Label: PERIMETER
Attribute_Definition: Perimeter of feature in internal units.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Perimeter is always zero for point coverages. Values are automatically generated.
Attribute:
Attribute_Label: SRFOLDSYMB#
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRFOLDSYMB-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PTTYPE

Attribute_Definition: location points for map symbol for large folds and arrowhead for plunge

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: f.a., syncline, certain

Enumerated_Domain_Value_Definition: Syncline

Enumerated_Domain:

Enumerated_Domain_Value: _I_anticline_i_

Enumerated_Domain_Value_Definition: Overturned anticline

Enumerated_Domain:

Enumerated_Domain_Value: f.a. anticline, certain

Enumerated_Domain_Value_Definition: Anticline

Enumerated_Domain:

Enumerated_Domain_Value: plunge

Enumerated_Domain_Value_Definition: Arrowhead on trace of fold axis showing direction of plunge

Spatial_Data_Organization_Information: **srsamp_smoc**

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

Point_and_Vector_Object_Count: 220

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 0

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 45

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Label point

Point_and_Vector_Object_Count: 0

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Transverse Mercator

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -123.000000

Latitude_of_Projection_Origin: 0.000000
False_Easting: 500000.000000
False_Northing: 0.000000
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 0.000128
Ordinate_Resolution: 0.000128
Planar_Distance_Units: meters
Geodetic_Model:
Horizontal_Datum_Name: D_Clarke_1866
Ellipsoid_Name: Clarke 1866
Semi-major_Axis: 6378206.400000
Denominator_of_Flattening_Ratio: 294.978698
Entity_and_Attribute_Information:
Detailed_Description: **srsamp_smoc**
Entity_Type:
Entity_Type_Label: srsamp_smoc.pat
Attribute:
Attribute_Label: FID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.
Attribute:
Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.
Attribute:
Attribute_Label: AREA
Attribute_Definition: Area of feature in internal units squared.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Area is always zero for point coverages. Values are automatically generated.
Attribute:
Attribute_Label: PERIMETER
Attribute_Definition: Perimeter of feature in internal units.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Perimeter is always zero for point coverages. Values are automatically generated.
Attribute:
Attribute_Label: SRSAMP_SMOC#
Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRSAMP_SMOC-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute

Attribute_Label: PTTYPE

Attribute_Definition: Location of sample dated by radiometric or fission track methods, location of chemically analysed sample from Magic Mountain Gneiss, locations of reported fossils, and, locations of small outcrop of Vedder Complex, limestone (marble), or ultramafic rock too small to show at map scale.

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: age

Enumerated_Domain_Value_Definition: radiometric or fission-track age

Enumerated_Domain:

Enumerated_Domain_Value: fossil locality

Enumerated_Domain_Value_Definition: Fossil locality with identified fossil. See Table 1 in published text keyed to sample number (<http://pubs.usgs.gov/imap/i2592/>)

Enumerated_Domain:

Enumerated_Domain_Value: chem

Enumerated_Domain_Value_Definition: Location of sample collected for chemical analysis. See Table 5 in published text keyed to mapno (<http://pubs.usgs.gov/imap/i2592/>)

Enumerated_Domain:

Enumerated_Domain_Value: ls

Enumerated_Domain_Value_Definition: Small outcrop of limestone or marble, too small to show at map scale. Includes **Rocks of the western melange belt: Marble and limestone (Tkwm)**—Mostly coarsely crystalline, dark-gray to white marble in small to moderate-size pods. Mostly massive but locally bedded with bioclastic layers; **Trafton terrane of Whetten and others (1988)(TKtm): Marble and limestone**—Similar to unit TKwm. Locally highly fossiliferous bioclastic limestone such as at the abandoned Morcrop quarry on the north side of Porter Creek; **Rocks of the eastern melange belt: Marble (bm)**—Gray to white, locally with chlorite; coarsely crystalline. Danner (1966, p. 326-329) describes the deposits south of White Horse; **Bell Pass melange: Marble**—Coarsely crystalline marble exposed on Prairie Mountain; **Chilliwack Group of Cairnes (1944): Limestone and marble (PDcl)**—Mostly coarsely crystalline, gray to black. Carbonate rocks in small isolated pods and blocks; locally fossiliferous; **Chiwaukee Schist: Marble (Kcm)**—Thin to thick layers of coarsely crystalline white to gray marble, commonly with thin schist interbeds and associated calc-silicate schist; **Cascade River Schist: Marble (Tkcm)**—Coarsely crystalline gray to white marble with many impurities of quartz, plagioclase, and mica. Grades into calcareous mica schist; and **Napeequa Schist: Marble (Tknm, Knm)**—Coarsely crystalline white marble grading into calcareous schist and locally calc-silicate schist.

Enumerated_Domain:

Enumerated_Domain_Value: bv

Enumerated_Domain_Value_Definition: Small outcrop of: **Bell Pass melange: Vedder Complex of Armstrong and others (1983)**—Amphibolite, blueschist, micaceous quartzite, and mica-quartz schist.

Enumerated_Domain:

Enumerated_Domain_Value: um

Enumerated_Domain_Value_Definition: Small outcrop of ultramafic rock, too small to show at map scale, includes **Rocks of the western melange belt: Ultramafic rocks (Tkwu)**—Serpentinized peridotite and dunite. Nearby Tertiary plutons have recrystallized ultramafic rocks to higher grade assemblages, locally with enstatite and talc; **Rocks of the eastern melange belt: Ultramafic rocks (Tkeu)**—Serpentinite, metaperidotite, and metaclinopyroxenite. Dungan (1974, p. 48-53, 94) describes some ultramafic blocks with primary cumulus textures and others as harzburgite and dunite tectonite. Metamorphic minerals, mostly confined to rocks north of the South Fork of the Stillaguamish River are tremolite, talc, and olivine; **Easton Metamorphic Suite: Ultramafic rocks (Keu)**—Mostly serpentinite. Occurs in unit Keds and near faulted contacts with unit TKhm; **Bell Pass melange: Ultramafic rocks (bu)**—Commonly serpentinite; occurs along faults in the Prairie Mountain area; **Chiwaukum Schist: Ultramafic rocks (Kcu)**; and **Napeequa Schist: Ultramafic rocks (Tknu, Knu)**—Thick, large layers along Downey Creek are mostly metadunite (Grant, 1966, p. 110). Other bodies are serpentinized metadunite and metaperidotite. Rocks are dark green to black on fresh surfaces, weathering rusty orange to brown with relics of olivine in a felted mat of antigorite, talc, and tremolite (Crowder and others, 1966). The large body on Jordan Creek is mostly serpentinized peridotite (Bryant, 1955, p. 51-53).

Attribute:

Attribute_Label: SAMPNO

Attribute_Definition: Field number of rock sample analysed for age determination or chemical content

Attribute_Definition_Source: Author

Attribute:

Attribute_Label: DESCRIPTION

Attribute_Definition: additional information about sample, includes, comments on lithology, age, minerals analysed for radiometric age etc.

Attribute:

Attribute_Label: AGE

Attribute_Definition: age(s) of samples dated by radiometric or fission track methods. See Table 2 in published text keyed to mapno (<http://pubs.usgs.gov/imap/i2592/>)

Attribute:

Attribute_Label: REFERENCE

Attribute_Definition: bibliographic reference for age of sample; see References Cited in map text (see <http://pubs.usgs.gov/imap/i2592/>)

Attribute:

Attribute_Label: MAPNO

Attribute_Definition: number on printed map if ptype = fossil locality, age, or chem; keyed to Tables 1, 2 or 5 respectively (see <http://pubs.usgs.gov/imap/i2592/>)

Attribute:

Attribute_Label: UNIT

Attribute_Definition: Source unit of sample.

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Barlow Pass

Enumerated_Domain_Value_Definition: **Barlow Pass Volcanics of Vance (1957a, b) (late and middle Eocene): Volcanic rocks**—Basaltic andesite, basalt and, rhyolite in flows, breccia, and tuff interbedded with tuffaceous to feldspathic sandstone, conglomerate, and minor argillite. Basalt in the upper part of the section forms dark brown columnar flows. Basaltic andesite occurring lower in section is generally dark-green to gray, aphyric, massive, and dense. Rhyolite occurs as thick flows, typically weathering light-green to white with flow laminations; commonly spherulitic. Volcanic rocks are mostly highly altered to a dense mat of chlorite, epidote, calcite, and sericite; porphyritic and trachytoid textures are relict. Bedding in volcanic rocks is obscure except in some water-laid tuffs

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: basalt dike

Enumerated_Domain_Value_Definition: basalt dike as described in Bectal Inc. (1979)

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Bell Pass melange

Enumerated_Domain_Value_Definition: **Bell Pass melange (Early Cretaceous and Late Jurassic)**—Metagabbro, metadiorite, metatonalite, silicic gneiss, fine-grained epidote amphibolite gneiss, micaceous quartzite, amphibole schist, and ultramafic rocks. Lesser amounts of phyllitic argillite, cherty phyllite, chert, graywacke, semischist, metavolcanic rocks, and marble. Rocks highly variable, commonly mylonitic and (or) cataclastic: **Yellow Aster Complex of Misch (1966)**—**Gneissic rocks**—Siliceous gneiss, pyroxene gneiss, and associated metagabbro, metadiabase, and metatonalite. Includes areas lacking siliceous gneiss but including meta-igneous rocks with strongly mylonitic quartz bands *and* **Vedder Complex of Armstrong and others (1983)**—Amphibolite, blueschist, micaceous quartzite, and mica-quartz schist.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Cascade Pass dike

Enumerated_Domain_Value_Definition: **Cascade Pass dike (Miocene)**—

Tonalite—Medium-grained hornblende-biotite tonalite, hypidiomorphic granular with small glomeroporphyrocrysts of mafic minerals. Massive and coarsely jointed, with local areas of disseminated sulfide minerals. The dike has fine-grained, porphyritic, chilled margins; contact lit-par-lit complexes are common, and alteration is pervasive locally

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Chaval pluton

Enumerated_Domain_Value_Definition: **Chaval pluton (Late Cretaceous): Biotite-hornblende quartz diorite and diorite**—Mostly medium grained biotite-hornblende quartz diorite, locally diorite or tonalite, with clinopyroxene and hypersthene locally and accessory iron-titanium oxide, allanite, zircon, and apatite. Textures are mostly igneous but near the margins become subid-ioblastic with little or no relict igneous texture except for rare euhedral oscillatory-zoned plagioclase. Margins of main pluton are gneissic and minerals are mylonitized and recrystallized. Flaser gneiss common. Metamorphic minerals are epidote, blue-green hornblende (commonly with cores of brown igneous(?) hornblende, biotite, and garnet). Some euhedrally zoned epidote.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Chilliwack Gp.

Enumerated_Domain_Value_Definition: **Chilliwack Group of Cairnes (1944)**

(Permian to Devonian): Sedimentary rocks—Well-bedded, gray to brown and black argillite and volcanic subquartzose sandstone with minor pebble conglomerate and rare chert. Includes some volcanic rocks locally. Graded beds, scour structures, and load casts locally prominent; some rhythmite. Locally, sandstone beds strongly disrupted in argillite matrix. Rocks grade rapidly from little deformed to phyllitic with a pronounced foliation generally subparallel to bedding *and* **Limestone and marble**—Mostly coarsely crystalline, gray to black. Carbonate rocks in small isolated pods and blocks; locally fossiliferous

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Chiwaukum Schist

Enumerated_Domain_Value_Definition: **Chiwaukum Schist (Late Cretaceous):**

Biotite schist and amphibolite—Mostly fine grained to medium grained, well-laminated graphitic garnet-biotite-quartz-oligoclase (or andesine) schist, locally with cordierite, andalusite, staurolite, or kyanite and rarely with sillimanite. Abundant schistose amphibolite, fine-grained hornblende gneiss, hornblende-biotite schist, and less common calc-silicate schist and marble. Cut by dikes and sills of light-colored biotite tonalite and pegmatite; **Hornblende schist and amphibolite**—Black to light-green, fine- to medium-grained garnet-hornblende-quartz-plagioclase schist, gneiss, and amphibolite. Lepidoblastic to granofelsic, rarely garbenschiefer, with pods or layers rich in biotite, clinopyroxene, and (or) epidote; and **Garnet-graphite-mica schist**—Predominantly very fine grained garnet-graphite-biotite-oligoclase (or andesine)-quartz schist with kyanite and (or) staurolite

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Nason Ridge Mig.Gn.

Enumerated_Domain_Value_Definition: **Nason Ridge Migmatitic Gneiss (Late**

Cretaceous)—In south, mostly heterogeneous light-colored tonalite to granodioritic gneiss interlayered with mica schist and amphibolite similar to the Chiwaukum Schist. Predominantly crystalloblastic. Most common lithology is medium-grained biotite gneiss with a slightly porphyroblastic appearance due to anastomosing mica layers surrounding larger plagioclase crystals or aggregate grains. Contacts between gneiss and schist are both sharp and gradational along and across strike. Cross-cutting sills, dikes, and irregular bodies of light-colored fine-grained to pegmatitic tonalite and gneiss are also abundant in migmatitic phases. Most of unit has 50 percent or more light-colored gneiss. Grades northward into more uniform, mostly medium grained garnet-biotite-quartz-oligoclase (or andesine) gneiss which is difficult to distinguish from Chiwaukum Schist. Rare rounded relict kyanite and sillimanite occur within sericite knots

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Cloudy Pass bath

Enumerated_Domain_Value_Definition: **Cloudy Pass batholith and associated rocks**

(Miocene): Granodiorite, tonalite, and gabbro, undivided

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Cool Glacier stock

Enumerated_Domain_Value_Definition: **Cool Glacier stock: Granodiorite**—Pyroxene-biotite-hornblende granodiorite and quartz monzodiorite. Medium grained, hypidiomorphic granular

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Cyclone Lake pluton

Enumerated_Domain_Value_Definition: **Cyclone Lake pluton (Late**

Cretaceous)—Light-colored, fine- to medium-grained, muscovite-biotite metagranodiorite (meta-alaskite). Subhedral sodic plagioclase with relict euhedral oscillatory zoning in a matrix of quartz and microcline, locally blastomylonitic along foliation planes with sparse muscovite and biotite. Common myrmekite. Minor subhedral clinozoisite with rare allanite cores associated with micas. C.I. = 3-7 (Ford and others, 1988, p. 53). Faintly gneissic in outcrop. Rocks become coarser grained and more gneissic towards north margin of pluton where they grade abruptly into the Jordan Lakes pluton

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: dioritic stock

Enumerated_Domain_Value_Definition: dioritic stock as described in Bectal Inc. (1979)

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Easton Meta. Suite

Enumerated_Domain_Value_Definition: **Easton Metamorphic Suite: Shuksan**

Greenschist (Early Cretaceous)—Predominantly fine-grained greenschist, sodic actinolite-bearing greenschist, and (or) blueschist. Locally includes quartzitic greenschist, iron- and manganese-rich quartzite (metachert), greenstone, and graphitic phyllite. Rare relict clinopyroxene in some greenschist. Common also is leucogreenschist, generally with pumpellyite, characterized by a mosaic of albite porphyroblasts that have mineral inclusions aligned in the foliation. Common are epidote clots or balls, generally less than 1mm in diameter, and probably derived from vesicle fillings in the protolith basalt (Misch 1965; Haugerud, 1980, p. 39-44).

Schists are commonly conspicuously layered on centimeter scale, and foliation and layering are tightly folded on outcrop scale. Locally interlayered with units Ked and Keds; **Garnet**

amphibolite (Early Cretaceous)—Garnet amphibolite and muscovite-quartz schist, barroisite schist, hornblende-garnet rocks, and rare eclogite commonly surrounded by greenschist. Most of these rocks are coarser grained than typical Shuksan lithologies. The garnet amphibolite is overprinted by blueschist-facies metamorphism (Brown and others, 1982): **Darrington Phyllite**

(Early Cretaceous)—Predominantly black, highly fissile sericite-graphite-albite-quartz phyllite, typically with abundant quartz veinlets; commonly complexly folded. Most phyllite has a strong crinkle lineation. Some well-foliated metasandstone. Locally interlayered with unit Kes; and **Mixed greenschist and silver-colored phyllite**

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: EMB

Enumerated_Domain_Value_Definition: **Rocks of the eastern melange belt (middle**

Eocene to Late Cretaceous): Mafic metavolcanic rocks with mostly subordinate graywacke and foliated graywacke, argillite and phyllitic argillite, chert, and

marble: Argillite—Black, locally foliate argillite with limy concretions; **Chert**—Mostly white-weathering, red or black ribbon chert and metachert making up to 20 to 80 percent of unit. Uniformly banded to complexly disrupted. Some chert as thin laminae in cherty argillite;

Marble—Gray to white, locally with chlorite; coarsely crystalline. Danner (1966, p. 326-329) describes the deposits south of White Horse; mostly in small pods.; and **Gabbro**—On the South Fork of the Stillaguamish River, unit consists of gabbro, layered gabbro, and interlayered cumulate

ultramafic rocks (wehrlite) (Dungan, 1974, p. 46-53). Includes some metatonalite and gneissic amphibolite. Gabbros are generally partially altered to albite, actinolite, epidote, and chlorite.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Foam Creek stock

Enumerated_Domain_Value_Definition: **Foam Creek stock (Late**

Cretaceous)—Medium-grained biotite metagranodiorite with distinctive decussate biotite books. CI=10-15, rarely 25 (Ford and others, 1988, p. 17). Hypidiomorphic granular with faint relict oscillatory zoned oligoclase-andesine. Commonly retrogressively altered. Margins are highly gneissic

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Gamma Ridge Vols.

Enumerated_Domain_Value_Definition: **Volcanic rocks of Gamma Ridge (Pliocene):**

Volcanic rocks—Altered tuff, volcanic breccia, volcanic sandstone, welded tuff, and minor flows of basalt. Variegated red, brown, green, and white; bedding obscure; altered to carbonate minerals, sericite, clays, and chlorite; siliceous kaolinite common near Gamma Peak; glassy rocks commonly spherulitic; common veins of zeolites, carbonate minerals, and quartz. Before alteration, composition ranged from rhyolite to basalt

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Granite Falls stock

Enumerated_Domain_Value_Definition: **Granite Falls stock and associated plutons**

(middle Eocene)—Biotite hornblende granodiorite, mostly fine grained hypidiomorphic granular, slightly porphyritic. Locally contains hypersthene and small amounts of elbaite (tourmaline). Commonly highly altered.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Grotto:DeadDuck stock

Enumerated_Domain_Value_Definition: **Grotto batholith (Oligocene): Dead Duck**

pluton—Hornblende-biotite tonalite and granodiorite, with minor augite and hypersthene

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Grotto:MonteCristo s

Enumerated_Domain_Value_Definition: **Grotto batholith (Oligocene): Monte Cristo**

stock—Hornblende-biotite granodiorite and tonalite. Locally contains augite and hypersthene. Commonly somewhat altered to chlorite, epidote, and sphene

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Hanson Lk. vols.

Enumerated_Domain_Value_Definition: **Rhyolite of Hanson Lake (middle**

Eocene)—Dark-colored, glassy to devitrified biotite rhyolite ash-flow tuff. Commonly perlitic, contains sanidine, plagioclase, quartz, and garnet phenocrysts. Poorly exposed near Hanson Lake and to the west where the unit includes quartz- and clinopyroxene-bearing mafic tuff. Northwest of Bosworth Lake, mafic tuff and breccia are highly altered to epidote and smectites

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: HHM

Enumerated_Domain_Value_Definition: **Helena-Haystack mélange (middle Eocene to Late Cretaceous): Greenstone, foliated greenstone, and greenschist**—Greenstone including basalt with relict clinopyroxene and plagioclase to well-recrystallized actinolitic greenstone, and greenschist, commonly with pumpellyite, prehnite, stilpnomelane, and locally with aragonite in veins. Cruver (1983, p. 23) reports lawsonite in metagraywacke associated with greenstone of his Haystack Mountain unit on strike to the northwest. Outcrops are commonly massive, but on Big and Little Deer Peaks, probable bedding is revealed by broad color bands and contrasting joint patterns when viewed from afar; **Diabase and gabbro**—Uralitic metadiabase and metagabbro, rarely with relict brown hornblende and saussuritic plagioclase, and very rare relict clinopyroxene. Partially to completely altered to actinolite and pumpellyite with pseudomorphous ophitic or subophitic textures. Commonly cut by mylonitic to cataclastic microshears. Commonly weathers out of serpentinite matrix as steep-sided hillocks: **Foliated metavolcanic rocks**—Silicic metaporphry and micaceous quartz-feldspar schist, commonly with relict plagioclase phenoclasts. Foliated light-colored greenstone and greenstone. On Helena Ridge, includes considerable foliated greenstone, some with relict pillows. Northwest of Darrington, includes considerable metabasalt with relict plagioclase and clinopyroxene in an altered felty or trachytic matrix; **Amphibolite**—Fine-grained amphibolite with well-crystallized green hornblende and plagioclase, partially altered to chlorite, epidote, and pumpellyite(?); and **Tonalite**—Medium-grained hypidiomorphic hornblende tonalite altered to chlorite, prehnite, epidote, and pumpellyite(?). Rocks are locally gneissic and cataclastic, interlayered with amphibolite (TKha) at north contact of tonalite

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Hidden Lake stock

Enumerated_Domain_Value_Definition: **Hidden Lake stock (middle Eocene to Late Cretaceous)**—Biotite metatonalite, based on modes, but rocks are granodiorite based on CIPW norms and $d^{18}O$ values greater than 10 (Ford and others, 1988, p. 26; White and others, 1988, p. 30). Relict hypidiomorphic granular texture with plagioclase mostly filled with well-crystallized epidote and muscovite; some crushed grain margins have recrystallized, and quartz is sutured. Some K-feldspar is microcline. Rocks are massive and sharply intrusive

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Jordan Lks. pluton

Enumerated_Domain_Value_Definition: **Jordan Lakes pluton (Late Cretaceous)**—Medium-grained hornblende-biotite tonalite and granodiorite. Hypidiomorphic granular with euhedral to subhedral plagioclase with relict euhedral oscillatory zoning and locally filled with clinozoisite and muscovite and in a mesostasis of microcline or perthite. Myrmekite common. $CI=5-21$, generally $10-17$

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Magic Mtn. Gneiss

Enumerated_Domain_Value_Definition: **Magic Mountain Gneiss (Tertiary and Late Cretaceous)**—Light-colored chlorite-muscovite-epidote-plagioclase gneiss or flaser gneiss interlayered with chlorite-epidote-quartz-albite schist, locally with garnet and hornblende. Plagioclase, strikingly filled with epidote, is mostly albite and oligoclase; epidote is strongly zoned, mostly to iron-rich rims; chlorite is typically Mg rich. The gneiss layers range from flaseroid with epidote-filled plagioclase insets in a blastomylonitic quartz matrix to strongly layered quartz and albite rocks with numerous stringers of epidote and chlorite. Gneiss layers and greenschist layers

are most commonly separated, but gradations occur. Scale of layering ranges from 5 cm to 6 m, but near the contact with the Cascade River Schist, greenschist layers increase in thickness and may be as thick as 60 m. Locally this contact is marked by a monolithologic breccia of equidimensional light-colored gneiss clasts, commonly augen shaped and as large as 10 cm in a greenschist matrix.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Mount Pilchuck stock

Enumerated_Domain_Value_Definition: **Mount Pilchuck stock (middle Eocene):**

Granite and granodiorite—Mostly fine grained, slightly porphyritic, hypidiomorphic granular biotite granite with resorbed quartz phenocrysts. $Cl=4-8$, locally as much as 40 percent K-feldspar, mostly perthite (Wiebe, 1963, p. 21). Wiebe (1963, p. 24-31) describes accessory cordierite and one occurrence of garnet. Zircon and tourmaline (elbaite) are also common accessories. Rock is massive, has chilled margins, and has thermally metamorphosed the country rock

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Mt Buckindy pluton

Enumerated_Domain_Value_Definition: **Mount Buckindy pluton (Miocene): Tonalite and granodiorite**—Mostly porphyritic biotite-hornblende tonalite to hornblende tonalite porphyry. Rocks are quartz-phyric with hypidiomorphic granular groundmass, but heterogeneous in grain size and texture.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Sauk Ring dike

Enumerated_Domain_Value_Definition: **Sauk ring dike (Oligocene and (or) middle Eocene)**—Gray dacite and andesite porphyry with abundant plagioclase and rare quartz phenocrysts; highly altered to epidote, chlorite, sericite, albite, and carbonate minerals. At northwest base of Sheep Mountain, rocks are a mixture of holocrystalline hornblende tonalite, dacite, and porphyry, as well as gradational types in between

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Sloan Cr. plutons

Enumerated_Domain_Value_Definition: **Sloan Creek plutons (Late Cretaceous)**—Biotite-hornblende tonalitic gneiss, flaser gneiss, and local gneissic metatonalite; medium grained, homogeneous, crystalloblastic gneissose to strongly flaseroid; locally strongly mylonitic. $Cl=0-37$, but for most rocks $Cl=20-30$ (Ford and others, 1988, p. 71). Locally contains garnet. Plagioclase normally zoned or unzoned and strongly stress twinned but with relict patchy zoning and faint oscillatory zoning and synneusis twins (Heath, 1971, p. 62). Retrogressive alteration is pronounced but somewhat sporadic; epidote minerals and sericite commonly fill plagioclase cores; mafic minerals are altered to chlorite, sphene, and prehnite. As mapped, includes some interlayered flaser gneiss and Nason Ridge Migmatitic Gneiss (Kng)

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Squire Cr. stock

Enumerated_Domain_Value_Definition: **Squire Creek stock and related intrusive rocks (Oligocene): Tonalite**—Predominantly uniform hornblende-biotite tonalite and granodiorite, medium-grained and hypidiomorphic granular. Locally rich in small hornblende diorite

inclusions. CI=12-18 as reported in Vance (1957a, p. 241-274). Locally in interior, pluton is fine-grained and with lower CI; **Biotite tonalite**—On Vesper Peak mostly medium-grained hypidiomorphic inequigranular; rarely hornblende-biotite tonalite with rare hypersthene. CI=9-28, mostly about 12-20 (Baum, 1968, p. 20); **Hornblende quartz diorite**—At Granite Lake the rocks are a porphyritic hornblende-clinopyroxene quartz diorite with euhedral, highly corroded, pale-brown hornblende phenocrysts. Dikes of a similar but more porphyritic rock-type are common in the Mount Higgins area; and **Tonalite of the Shake Creek stock**—Biotite-hornblende tonalite, fine-grained, highly altered

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Sulphur Mtn. pluton

Enumerated_Domain_Value_Definition: **Sulphur Mountain pluton (Late Cretaceous):**

Metagranodiorite and metatonalite—Medium-grained hornblende-biotite metagranodiorite and metatonalite characterized by large clinopyroxene prisms as long as 8 cm and quartz augen as large as 1.4 cm with accessory subhedral clinozoisite. Textures are xenoblastic to hypidiomorphic. Sphene and rare garnet and allanite. Calcic oligoclase commonly has faint euhedral oscillatory zoning but is also highly filled with epidote. CI=5-19, mostly about 10-13

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Tenpeak pluton

Enumerated_Domain_Value_Definition: **Tenpeak pluton (Late Cretaceous):**

Metatonalite and tonalitic gneiss—Light-colored medium-grained hornblende-biotite tonalite and tonalitic gneiss. Xenoblastic to hypidiomorphic, commonly with aligned euhedral hornblende prisms, locally as long as 1 cm. CI=15-20, locally as much as 40. Subhedral epidote and pseudomymekitic epidote common. Allanite and garnet occur on west margin of unit. Hornblende commonly zoned from brownish green to bluish green on rims. Sodic andesine crystals commonly broken and with faint euhedral oscillatory zoning.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Tonalite of Bench Lk

Enumerated_Domain_Value_Definition: **Tonalitic gneiss of Bench Lake (Late**

Cretaceous)—Mostly light colored, fine grained heterogeneous biotite tonalitic gneiss, locally with hornblende. Subhedral clinozoisite associated with mafic minerals. CI=3-19, mostly about 9-12. Layers and pods of finer grained biotite gneiss, garnet biotite-hornblende schist, and amphibolite locally making up 5-10 percent of rock. Mafic schlieren may be swirled. Cut by light-colored tonalite, pegmatite, and aplite dikes. Contact with unit Kblg is gradational.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Trafton

Enumerated_Domain_Value_Definition: **Trafton terrane of Whetten and others**

(1988) (middle Eocene to Late Cretaceous)—Predominantly greenstone and banded chert with subordinate graywacke and argillite. Commonly highly sheared and mixed on all scales. Greenstone has relict plagioclase and clinopyroxene, but is now mostly chlorite, carbonate minerals, and brownish pumpellyite(?); some rocks with veins of green pumpellyite. Chert is red and black, locally highly recrystallized. Minor diabase. Argillite locally phyllitic; **Marble and limestone**—Similar to unit TKwm. Locally highly fossiliferous bioclastic limestone such as at the abandoned Morcrop quarry on the north side of Porter Creek

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: WMB

Enumerated_Domain_Value_Definition: **Rocks of the western melange belt (middle Eocene to Late Cretaceous): Semischist, slate, and phyllite**—Mostly pervasively foliated gray to black lithofeldspathic and volcanolithic subquartzose sandstone and semischist. Locally abundant fine- to medium-cobble conglomerate. Commonly interbedded with argillite or phyllite. Locally well developed rhythmite. Where foliation is less well developed, sedimentary features, including graded beds and load casts, are locally well preserved. Metamorphic minerals, which locally replace matrix and framework grains and also occur in veins, are carbonate minerals, prehnite, pumpellyite, chlorite, and sericite. Unit includes rare greenstone derived from mafic volcanic breccia, tuff, and flows. Also includes locally abundant chert; **Phyllite**—Gray, brown to black phyllite, less abundant semischist, locally abundant chert and rare greenstone. Includes subordinate thin beds of recrystallized sandstone and semischist and rare stretched-pebble conglomerate. Locally with well-developed pencil structures and rarer crinkle lineation. Metamorphic minerals are sericite, carbonate minerals, chlorite, prehnite, and pumpellyite(?). Metasandstone commonly forms small boudins as long as a few meters; **Marble and limestone**—Mostly coarsely crystalline, dark-gray to white marble in small to moderate-size pods. Mostly massive but locally bedded with bioclastic layers

Spatial_Data_Organization_Information: **srcleavage**

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 58

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Label point

Point_and_Vector_Object_Count: 37

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains

Point_and_Vector_Object_Count: 37

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 28

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Label point

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

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Transverse_Mercator:

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Longitude_of_Central_Meridian: -123.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

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Ordinate_Resolution: 0.000064

Planar_Distance_Units: meters

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Horizontal_Datum_Name: D_Clarke_1866

Ellipsoid_Name: Clarke 1866

Semi-major_Axis: 6378206.400000

Denominator_of_Flattening_Ratio: 294.978698

Entity_and_Attribute_Information:

Detailed_Description:

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Entity_Type_Label: srcleavage.aat

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Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

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Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

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Attribute_Definition_Source: ESRI

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Unrepresentable_Domain: Whole numbers that are automatically generated.

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Unrepresentable_Domain: Whole numbers that are automatically generated.

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Attribute_Definition: Internal node number for the left polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: RPOLY#

Attribute_Definition: Internal node number for the right polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: LENGTH

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SRCLEAVAGE#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRCLEAVAGE-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LTYPE

Attribute_Definition: geologic contact description

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: scratch boundary, certain

Enumerated_Domain_Value_Definition: polygon boundary that does not plot.

Detailed_Description:

Entity_Type:

Entity_Type_Label: srcleavage.pat

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Perimeter of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SRCLEAVAGE#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRCLEAVAGE-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PTYPE

Attribute_Definition: symbol of geologic unit

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: ph

Enumerated_Domain_Value_Definition: Area of well-developed foliation in rocks of eastern and western melange belts

Enumerated_Domain:

Enumerated_Domain_Value: o

Enumerated_Domain_Value_Definition: Isolated area of no foliation.

Spatial_Data_Organization_Information: **srdikes**

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 3

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Label point

Point_and_Vector_Object_Count: 3

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains

Point_and_Vector_Object_Count: 3

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 28

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Transverse Mercator

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -123.000000

Latitude_of_Projection-Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abcissa_Resolution: 0.000008

Ordinate_Resolution: 0.000008

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: D_Clarke_1866

Ellipsoid_Name: Clarke 1866

Semi-major_Axis: 6378206.400000

Denominator_of_Flattening_Ratio: 294.978698

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: srdikes.aat

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: FNODE#

Attribute_Definition: Internal node number for the beginning of an arc (from-node).

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: TNODE#

Attribute_Definition: Internal node number for the end of an arc (to-node).

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: LPOLY#

Attribute_Definition: Internal node number for the left polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: RPOLY#

Attribute_Definition: Internal node number for the right polygon.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Whole numbers that are automatically generated.

Attribute:

Attribute_Label: LENGTH

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SRDIKES#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRDIKES-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LTYPE

Attribute_Definition: geologic contact description

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: scratch boundary, certain

Enumerated_Domain_Value_Definition: polygon boundary that does not plot.

Detailed_Description:

Entity_Type:

Entity_Type_Label: srdikes.pat

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA
Attribute_Definition: Area of feature in internal units squared.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: PERIMETER
Attribute_Definition: Perimeter of feature in internal units.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SRDIKES#
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Sequential unique whole numbers that are automatically

generated.

Attribute:

Attribute_Label: SRDIKES-ID
Attribute_Definition: User-defined feature number.
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PTYPE
Attribute_Definition: symbol of geologic unit
Attribute_Definition_Source: Author
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Tpd

Enumerated_Domain_Value_Definition: **Mount Pilchuck stock: Dike**

swarm—Concentration of granite and granite porphyry dikes making up as much as 50 percent of unit TKwg rock ground. May include numerous dikes and sills associated with the Bald Mountain pluton

Enumerated_Domain:

Enumerated_Domain_Value: o

Enumerated_Domain_Value_Definition: Isolated area of no dikes.

Spatial_Data_Organization_Information: **srstructure**

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

Point_and_Vector_Object_Count: 2880

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 0

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 28

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Label point

Point_and_Vector_Object_Count: 2549

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Transverse Mercator

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -123.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abcissa_Resolution: 0.000128

Ordinate_Resolution: 0.000128

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: D_Clarke_1866

Ellipsoid_Name: Clarke 1866

Semi-major_Axis: 6378206.400000

Denominator_of_Flattening_Ratio: 294.978698

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: srstruct.pat

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Area is always zero for point coverages. Values are automatically generated.

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Perimeter of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Perimeter is always zero for point coverages. Values are automatically generated.

Attribute:

Attribute_Label: SRSTRUCT#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRSTRUCT-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PTTYPE

Attribute_Definition: strike and dip of planar structures and bearing and plunge of linear structures

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: _I_lineation_i_

Enumerated_Domain_Value_Definition: inclined lineation

Enumerated_Domain:

Enumerated_Domain_Value: bedding w/tops

Enumerated_Domain_Value_Definition: strike and dip of bedding; top direction known

Enumerated_Domain:

Enumerated_Domain_Value: bedding

Enumerated_Domain_Value_Definition: strike and dip of bedding; top direction unknown

Enumerated_Domain:

Enumerated_Domain_Value: horizontal lineation

Enumerated_Domain_Value_Definition: strike of lineation

Enumerated_Domain:

Enumerated_Domain_Value: foliation

Enumerated_Domain_Value_Definition: strike and dip of aligned planar minerals in metamorphic rocks

Enumerated_Domain:

Enumerated_Domain_Value: fault_ball
Enumerated_Domain_Value_Definition: position of ball symbol showing downthrown side of high-angle fault

Enumerated_Domain:

Enumerated_Domain_Value: vert foliation and bedding OK

Enumerated_Domain_Value_Definition: strike of vertical foliation and parallel bedding: top direction unknown

Enumerated_Domain:

Enumerated_Domain_Value: ot bedding w/tops OK

Enumerated_Domain_Value_Definition: strike and dip of overturned bedding; original top direction known

Enumerated_Domain:

Enumerated_Domain_Value: vert bedding OK

Enumerated_Domain_Value_Definition: Vertical bedding; top direction unknown

Enumerated_Domain:

Enumerated_Domain_Value: vert bedding w/tops OK

Enumerated_Domain_Value_Definition: vertical bedding; top direction known

Attribute:

Attribute_Label: DIP

Attribute_Definition: Dip of planar structure (angle of plane to horizontal) or plunge of lineation (angle of lineation to horizontal)

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Attribute:

Attribute_Label: STRIKE

Attribute_Definition: Strike of planar structure (azimuth of horizontal line on plane) or azimuth of linear structure

Spatial_Data_Organization_Information: **srrocksamp**

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

Point_and_Vector_Object_Count: 722

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 49

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Transverse Mercator

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -123.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate-Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000128

Ordinate_Resolution: 0.000128

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: D_Clarke_1866

Ellipsoid_Name: Clarke 1866

Semi-major_Axis: 6378206.400000

Denominator_of_Flattening_Ratio: 294.978698

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: srrocksamp.pat

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Area is always zero for point coverages. Values are automatically generated.

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Perimeter of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Perimeter is always zero for point coverages. Values are automatically generated.

Attribute:

Attribute_Label:SRROCKSAMP#

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: SRROCKSAMP-ID

Attribute_Definition: User-defined feature number.

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PTTYPE

Attribute_Definition: archival category

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: archival

Enumerated_Domain_Value_Definition: most representative sample or unusual specimen in easily retrieved archive, North Cascades National Park, Marblemount, WA

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: store

Enumerated_Domain_Value_Definition: sample in boxed storage, North Cascades National Park, Marblemount, WA

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: combine

Enumerated_Domain_Value_Definition: multiple samples from same collection site in archive, store, and sent to other researcher categories

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: bm

Enumerated_Domain_Value_Definition: sample sent to Professor Robert Miller at San Jose State University, San Jose, CA

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: jd

Enumerated_Domain_Value_Definition: sample sent to Joe Dragovich at Washington Department of Natural Resources, Division of Geology and Earth Resources

Attribute_Label: SAMPNO

Attribute_Definition: Field number of sample

Attribute_Definition_Source: Author

Attribute:

Attribute_Label: SEL

Attribute_Definition: number indicating category (archival or store, etc.) and existence of thin section for sample

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: existence of thin section unknown

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: archival sample, no thin section

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2

Enumerated_Domain_Value_Definition: archival sample with thin section

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3

Enumerated_Domain_Value_Definition: stored sample without thin section

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 4

Enumerated_Domain_Value_Definition: stored sample with thin section

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6

Enumerated_Domain_Value_Definition: multiple samples at collection site. Some may have thin sections (see description field below)

Attribute:

Attribute_Label: DESCRIPTION

Attribute_Definition: additional information about sample, includes, comments on lithology, age, references, etc. For "combine" samples, identifies those with thin sections

Attribute_Definition_Source: Author

Attribute:

Attribute_Label: UNIT

Attribute_Definition: Source unit of sample

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Bald Mountain pluton

Enumerated_Domain_Value_Definition: **Bald Mountain pluton (age uncertain):**

Granodiorite and granite; number of samples of this unit = 9; for description see

downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Barlow Pass Volcanic Rocks: sed. rock

Enumerated_Domain_Value_Definition: **Barlow Pass Volcanics of Vance (1957a, b):**

Sandstone; number of samples of this unit = 27; for description see downloadable pdf of

Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Barlow Pass Volcanic Rocks: vol. rock

Enumerated_Domain_Value_Definition: **Barlow Pass Volcanics of Vance (1957a, b):**

Volcanic rocks; number of samples of this unit = 14; for description see downloadable pdf of

Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Bell Pass melange: Vedder Complex

Enumerated_Domain_Value_Definition: **Bell Pass melange: Vedder Complex**; number of samples of this unit = 5; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Bell Pass melange: Yellow Aster Cmplx
Enumerated_Domain_Value_Definition: **Bell Pass melange: Yellow Aster Complex of Misch (1966)**; number of samples of this unit = 9; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Bell Pass melange; ultramafite
Enumerated_Domain_Value_Definition: **Bell Pass melange (Early Cretaceous and Late Jurassic): Yellow Aster Complex of Misch (1966): Ultramafic rock**; number of samples of this unit = 1; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Bench Lk.; Banded tonalitic gneiss
Enumerated_Domain_Value_Definition: **Tonalitic gneiss of Bench Lake: Banded tonalitic gneiss**; number of samples of this unit = 35; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Breccia of Round Lake
Enumerated_Domain_Value_Definition: **Breccia of Round Lake**; number of samples of this unit = 4; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Cascade Pass dike
Enumerated_Domain_Value_Definition: Cascade Pass dike: Tonalite; number of samples of this unit = 11; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Cascade River Schist
Enumerated_Domain_Value_Definition: Cascade River Schist; number of samples of this unit = 98; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Chaval pluton
Enumerated_Domain_Value_Definition: Chaval pluton; number of samples of this unit = 7; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Chilliwack Group
Enumerated_Domain_Value_Definition: **Chilliwack Group of Cairnes (1944)**; number of samples of this unit = 24; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Chilliwack Group: volcanic rocks
Enumerated_Domain_Value_Definition: **Chilliwack Group of Cairnes (1944): Volcanic and metavolcanic rocks**; number of samples of this unit = 6; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:
Enumerated_Domain_Value: Chiwaukum Schist

Enumerated_Domain_Value_Definition: Chiwaukum Schist; number of samples of this unit = 32; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Cloudy Pass batholith and assoc. rocks

Enumerated_Domain_Value_Definition: **Cloudy Pass batholith and associated rocks**; number of samples of this unit = 22; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Cool Glacier stock

Enumerated_Domain_Value_Definition: Cool Glacier stock; number of samples of this unit = 1; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Cyclone Lake pluton

Enumerated_Domain_Value_Definition: Cyclone Lake pluton; number of samples of this unit = 7; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Darrington Phyllite

Enumerated_Domain_Value_Definition: **Easton Metamorphic Suite**: Darrington Phyllite; number of samples of this unit = 21; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Downey Creek sill complex

Enumerated_Domain_Value_Definition: Downey Creek sill complex; number of samples of this unit = 10; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Downey Mountain stock

Enumerated_Domain_Value_Definition: Downey Mountain stock; number of samples of this unit = 1; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: EMB; Trafton

Enumerated_Domain_Value_Definition: **Trafton terrane of Whetten and others (1988)**; number of samples of this unit = 17; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Eastern melange belt

Enumerated_Domain_Value_Definition: **Rocks of the eastern melange belt**; number of samples of this unit = 46; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Eldorado orthogneiss

Enumerated_Domain_Value_Definition: Eldorado Orthogneiss; number of samples of this unit = 5; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Eldorado orthogneiss: flaser gneiss

Enumerated_Domain_Value_Definition: Eldorado Orthogneiss: flaser gneiss; number of samples of this unit = 6; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Foam Creek stock

Enumerated_Domain_Value_Definition: Foam Creek stock; number of samples of this unit = 2; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Granite Falls stock

Enumerated_Domain_Value_Definition: Granite Falls stock; number of samples of this unit = 2; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Grassy Point stock

Enumerated_Domain_Value_Definition: Grassy Point stock; number of samples of this unit = 2; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: HH melange

Enumerated_Domain_Value_Definition: **Helena-Haystack mélange: Peridotite and serpentinite matrix, Greenstone, foliated greenstone, and greenschist, Diabase and gabbro, Sedimentary rocks, Amphibolite, Tonalite**; number of samples of this unit = 70; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Hardtack Lake pluton: metadiorite

Enumerated_Domain_Value_Definition: **Metadiorite**; number of samples of this unit = 2; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Hidden Lake Stock

Enumerated_Domain_Value_Definition: **Hidden Lake stock**; number of samples of this unit = 1; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Jordan Lakes pluton

Enumerated_Domain_Value_Definition: Jordan Lakes pluton; number of samples of this unit = 9; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Magic Mountain Gneiss

Enumerated_Domain_Value_Definition: Magic Mountain Gneiss; number of samples of this unit = 48; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Marblemount pluton
Enumerated_Domain_Value_Definition: Marblemount pluton; number of samples of this unit = 32; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Marblemount pluton:flaser gn. border

Enumerated_Domain_Value_Definition: Marblemount pluton: Flaser gneiss; number of samples of this unit = 2; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Metatonalite and metagabbro intrusions

Enumerated_Domain_Value_Definition: **Gabbroic intrusions**; number of samples of this unit = 10; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Mount Buckindy pluton

Enumerated_Domain_Value_Definition: Mount Buckindy pluton; number of samples of this unit = 4; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Napeequa Schist

Enumerated_Domain_Value_Definition: Napeequa Schist; number of samples of this unit = 86; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Nason Ridge Migmatitic Gneiss

Enumerated_Domain_Value_Definition: Nason Ridge Migmatitic Gneiss; number of samples of this unit = 10; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Older sandstone and conglomerate

Enumerated_Domain_Value_Definition: **Sandstone associated with the Straight Creek Fault**; number of samples of this unit = 2; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Pilchuck stock

Enumerated_Domain_Value_Definition: Mount Pilchuck stock; number of samples of this unit = 3; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Rhyolite of Hanson Lake

Enumerated_Domain_Value_Definition: Rhyolite of Hanson Lake; number of samples of this unit = 8; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Rocks of Glacier Peak Volcano

Enumerated_Domain_Value_Definition: **Rocks of Glacier Peak volcano and associated volcanic rocks and deposits: Dacite (Holocene and (or)**

Pleistocene)—Mostly clinopyroxene-hypersthene dacite. Forms flows and volcanic rubble on Glacier Peak volcano; number of samples of this unit = 1; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Sauk Ring Dike

Enumerated_Domain_Value_Definition: Sauk Ring dike; number of samples of this unit = 2; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Shuksan Greenschist

Enumerated_Domain_Value_Definition: **Easton Metamorphic Suite: Shuksan**

Greenschist; number of samples of this unit = 33; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Shuksan: Garnet-amphibolite unit

Enumerated_Domain_Value_Definition: **Easton Metamorphic Suite: Garnet**

amphibolite; number of samples of this unit = 4; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Slate of Rinker Ridge

Enumerated_Domain_Value_Definition: Slate of Rinker Ridge; number of samples of this unit = 10; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Sloan Creek plutons

Enumerated_Domain_Value_Definition: Sloan Creek plutons; number of samples of this unit = 14; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Squire Creek stock and related intrusive

Enumerated_Domain_Value_Definition: **Squire Creek stock and related intrusive**

rocks; number of samples of this unit = 5; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Sulphur Mountain pluton

Enumerated_Domain_Value_Definition: Sulphur Mountain pluton; number of samples of this unit = 16; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Sulphur Mountain pluton: flaser gneiss

Enumerated_Domain_Value_Definition: Sulphur Mountain pluton: Flaser gneiss; number of samples of this unit = 1; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Ten Peak pluton

Enumerated_Domain_Value_Definition: Ten Peak pluton; number of samples of this unit = 7; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Tonalitic gneiss of Bench Lake

Enumerated_Domain_Value_Definition: Tonalitic gneiss of Bench Lake; number of samples of this unit = 8; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Volcanic rocks of Gamma Ridge

Enumerated_Domain_Value_Definition: Volcanic rocks of Gamma Ridge: **Altered andesite and dacite flows**—Red to black andesite and dacite, plagioclase-phyric, trachytic; much altered to calcite, chlorite, and zeolites; number of samples of this unit = 1; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: WMB: metagabbro

Enumerated_Domain_Value_Definition: **Rocks of the western melange belt; Gabbro and diorite and Ultramafic rocks**; number of samples of this unit = 3; for description see downloadable pdf of Description of Map Units: <http://pubs.usgs.gov/imap/i2592/>

Enumerated_Domain:

Enumerated_Domain_Value: Western melange belt

Enumerated_Domain_Value_Definition: Western melange belt; **Semischist, slate, and phyllite; Phyllite, Volcanic rocks; Gabbro and diorite** number of samples of this unit = 36; for description see downloadable pdf of Description of Map Units:

<http://pubs.usgs.gov/imap/i2592/>

Attribute:

Attribute_Label: COUNTY2

Attribute_Definition: County in Washington State where sample collected

Attribute_Definition_Source: Author

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Chel

Enumerated_Domain_Value_Definition: Chelan County

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Skag

Enumerated_Domain_Value_Definition: Skagit County

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Snoh

Enumerated_Domain_Value_Definition: Snohomish County

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Format_Information_Content: Introduction, Acknowledgements, Summary of Geologic History, expanded description of rock units, tables, and reference list

Transfer_Size: 1.2 MB
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Format_Version_Date: 2006
Format_Specification: ARC/INFO v. 7.1.1
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