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**Mount St. Helens—A bibliography of geoscience literature,
1882-1986**

by

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INTRODUCTION

On May 18, 1980, Mount St. Helens in southwestern Washington erupted, producing a forest-leveling blast, a giant plume, widely distributed ashfalls, extensive lahars, flooding, and considerable property damage, and causing a tragic loss of life. This was the first major volcanic eruption in the conterminous United States since the Lassen Peak eruption of 1915.

Mount St. Helens' last major eruptive period was in the mid-nineteenth century, but the eruption of May 1980 did not come as a surprise. In a 1978 report, USGS scientists termed the possibility of a future eruption a "near certainty" (Crandell and Mullineaux, 1978, p. 22). In March 1980 scientists detected increased seismic activity followed by releases of ash and by other changes in the volcano, which culminated in the explosive eruption of May 18th. The location of Mount St. Helens in a fairly accessible area provided an unusual opportunity for physical, life, and social scientists to study at close range this catastrophic eruption and its widespread effects.

Scientists had studied Mount St. Helens and its environs before the May 1980 eruption; this bibliography includes about 100 works published between 1882 and 1979. More than 1,500 reports, maps, books, and articles on Mount St. Helens were published in the 6 years following the 1980 eruption, making this one of the most heavily studied geologic events in history.

The libraries of the U.S. Geological Survey in Reston, Virginia, and the Washington Division of Geology and Earth Resources in Olympia, Washington, recognized the need to bring together this vast amount of material and undertook a cooperative project to compile this bibliography and index of the literature on Mount St. Helens from historical times to the present.

SCOPE

Our primary intention was to collect the research done on the eruption-related geology and hydrology of Mount St. Helens through 1986. We focused on Washington State but

expanded geographically to provide adequate coverage of ashfall and meteorological, acoustical, climatic, and other far-ranging effects. Quaternary eruptions of Mount St. Helens produced widely-dispersed ash, commonly used as stratigraphic markers. Some of these studies have been listed, particularly when applicable to Washington State, but no attempt was made to reference all such reports.

In addition, we have included many overviews and summary treatments, which can be found under the headings "General Works" and "Chronology and History of the 1980 Eruption." We have also selected examples of the types of research being done in related disciplines such as biology, forestry, medicine, and the various social sciences, to illustrate the broader consequences of a geologic hazard.

The bibliography consists mainly of references to monographs, maps, journal articles, conference papers, abstracts, theses, and open-file reports. Purposely excluded were newspaper and news-magazine accounts, audiovisual materials, and ephemera.

The bibliography was compiled from the collections and files of the two libraries. Additional references were gathered from database searches on GeoRef, Geoarchive, Water Resources Abstracts, National Technical Information Service, Dissertation Abstracts Online, and Meteorological and Geostrophysical Abstracts. All items in the bibliography have been examined by the compilers.

ORGANIZATION

1. **BIBLIOGRAPHY:** Each citation is given in full. Works are listed alphabetically and chronologically by author, with an author's individual works preceding co-authored works. Joint author cross-references are interfiled alphabetically.

2. **SUBJECT INDEX:** References are grouped alphabetically under headings that provide either subject or geographic access. Only the author(s), date, and title are given, and reference must be made to the Bibliography for the full citation. Appropriate cross-references are provided. Repeated citations, from multiple publications and(or)

abstracts, are given once and marked with an asterisk (*). Particular attention has been given to specific geographic locations in Washington State, including named lakes, streams, cities, and counties.

3. LIST OF INDEX TERMS: All index terms and cross-references used in the Subject Index are listed alphabetically. Scanning this list should be helpful in suggesting subject approaches.

BIBLIOGRAPHIES

In addition to this bibliography, the user might wish to consult the following previously published bibliographies on Mount St. Helens:

BROWN, G. W., JR., 1983, Mount St. Helens and volcanic action—A computerized bibliography; 3rd edition: Edmonds, Wash., Tiburon Co., Tectonics Products, 206 p.

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RIGBY, J. G., 1981, Bibliographies of the geology and volcanic hazards of the Cascade Range volcanoes of Washington and Mount Hood, Oregon: Washington Division of Geology and Earth Resources Open-File Report 81-5, 42 p.

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Cowlitz Co.

Note: The 1980 eruption of Mount St. Helens impacted much of Cowlitz County. See specific aspects, e.g.

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MASS MOVEMENTS - AVALANCHES AND LANDSLIDES

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Note: Describes plans or actions to deal with potential or existant problems from eruption activity.

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Note: The 1980 eruption of Mount St. Helens impacted much of the Gifford Pinchot National Forest (which includes most of Skamania County and the eastern part of Lewis County). See specific aspects, e. g.,

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HYDROLOGY

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St. Helens Lake, *see* LAKES - ST. HELENS LAKE

St. Helens mining district, *see* MINERAL RESOURCES

Sediments

see

LAKE SEDIMENTS

MASS MOVEMENTS - AVALANCHES AND LANDSLIDES

MASS MOVEMENTS - LAHARS AND MUDFLOWS
SOILS
STREAM SEDIMENTS
VOLCANIC ASH

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Seismology, *see* EARTHQUAKES AND SEISMOLOGY

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HYDROLOGY
MASS MOVEMENTS - AVALANCHES AND LANDSLIDES
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see

BLAST - THERMAL SURVEYS GEOPHYSICS - THERMAL SURVEYS GEOTHERMAL RESOURCES

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Volcanism, *see* specific aspects of Mount St. Helens volcanism, e.g., EARTHQUAKES AND SEISMOLOGY, MASS MOVEMENTS, VOLCANIC ASH, etc.

Water quality, *see* HYDROLOGY - IMPACTS OF THE ERUPTIONS ON WATER QUALITY

Water supplies, *see* HYDROLOGY - IMPACTS OF THE ERUPTIONS ON MUNICIPAL WATER SYSTEMS

West Castle Creek Lake, *see* LAKES - WEST CASTLE CREEK LAKE

Williams Lake, *see* LAKES - WILLIAMS LAKE

LIST OF SUBJECT HEADINGS

- Acoustics, *see* BLAST — ACOUSTICS
- Aerial photography, *see* REMOTE SENSING
- Agriculture, *see* BIOLOGY — FLORA — AGRICULTURE
- Animals, *see* BIOLOGY — FAUNA
- AREAL GEOLOGY (BEFORE 1980)
- AREAL GEOLOGY (1980)
- AREAL GEOLOGY (POST 1980)
- Avalanches, *see* MASS MOVEMENTS — AVALANCHES AND LANDSLIDES
- BEAN CREEK
- BIBLIOGRAPHY
- BIOLOGY [GENERAL WORKS]
- BIOLOGY — FAUNA
- BIOLOGY — FAUNA — AQUATIC
- BIOLOGY — FAUNA — TERRESTRIAL
- BIOLOGY — FLORA
- BIOLOGY — FLORA — AGRICULTURE
- BIOLOGY — FLORA — FORESTRY
- BLAST
- BLAST — ACOUSTICS
- Blast — Biological effects, *see* BIOLOGY
- Blast — Deposits,
see
MASS MOVEMENTS — AVALANCHES AND LANDSLIDES
MASS MOVEMENTS — LAHARS AND MUDFLOWS
PYROCLASTIC FLOWS AND DEPOSITS
- BLAST — THERMAL SURVEYS
- Botany, *see* BIOLOGY — FAUNA
- BULGE
- BULL RUN WATERSHED
- Bumping Lake, *see* LAKES — BUMPING LAKE
- Carbon dating, *see* GEOCHRONOLOGY
- CASTLE CREEK
- Castle Creek Lake,
see
LAKES — SOUTH FORK CASTLE CREEK LAKE
LAKES — WEST CASTLE CREEK LAKE
- CASTLE ROCK, WASH.
- CAVES
- Channel morphology, *see* RIVER MORPHOLOGY
- CHRONOLOGY AND HISTORY BEFORE 1980
see also GEOCHRONOLOGY
- CHRONOLOGY OF THE 1980 ERUPTION ACTIVITY
- Clays, *see* VOLCANIC ASH — MINERALOGY
- CLEARWATER CREEK
- CLIMATIC EFFECTS
- CLIMATIC EFFECTS OF VOLCANIC ASH
- COLDWATER CREEK
- Coldwater Lake, *see* LAKES — COLDWATER LAKE
- COLUMBIA RIVER — BIOLOGY
see also LIMNOLOGY
- COLUMBIA RIVER — ENGINEERING GEOLOGY
- COLUMBIA RIVER — LAHARS, MUDFLOWS AND STREAM SEDIMENTS

Cowlitz Co.

Note: The 1980 eruption of Mount St. Helens impacted much of Cowlitz County. See specific aspects, e.g.:

HYDROLOGY
MASS MOVEMENTS — AVALANCHES AND
LANDSLIDES
MASS MOVEMENTS — LAHARS AND
MUDFLOWS
VOLCANIC ASH — DISTRIBUTION

COWLITZ RIVER — BIOLOGY

see also **LIMNOLOGY**

COWLITZ RIVER — ENGINEERING
GEOLOGY

COWLITZ RIVER — GUIDEBOOKS

COWLITZ RIVER — HYDROLOGY

COWLITZ RIVER — LAHARS, MUDFLOWS
AND STREAM SEDIMENTS

COWLITZ RIVER — PLANNING AND
EMERGENCY RESPONSE

COWLITZ RIVER — RIVER MORPHOLOGY

see also **RIVER MORPHOLOGY**

CRAB CREEK

CRATER

see also **DOME**

Dams, *see* DEBRIS DAMS

Dating, *see* GEOCHRONOLOGY

Davis Lake, *see* LAKES — DAVIS LAKE

DEBRIS DAMS

Dendrochronology, *see* GEOCHRONOLOGY

Disaster planning,

see

EMERGENCY RESPONSE
GEOLOGIC HAZARDS
PLANNING

DOME

see also **CRATER**

DREDGING

EARTHQUAKES AND SEISMOLOGY
[GENERAL WORKS]

EARTHQUAKES AND SEISMOLOGY (BEFORE
1980)

EARTHQUAKES AND SEISMOLOGY (1980)

EARTHQUAKES AND SEISMOLOGY (POST
1980)

ECOLOGY

ECONOMIC EFFECTS

Economic geology, *see* MINERAL RESOURCES

Electrical surveys, *see* GEOPHYSICS —
ELECTRICAL SURVEYS

Elk Lake area, *see* MOUNT ST. HELENS
SEISMIC ZONE

EMERGENCY RESPONSE

Note: Describes plans or actions to deal with potential or existant problems from eruption activity.

see also

COWLITZ RIVER — PLANNING AND
EMERGENCY RESPONSE
GEOLOGIC HAZARDS
PLANNING
TOUTLE RIVER SYSTEM — PLANNING
AND EMERGENCY RESPONSE

ENGINEERING GEOLOGY

see also

COLUMBIA RIVER — ENGINEERING
GEOLOGY
COWLITZ RIVER — ENGINEERING
GEOLOGY
DEBRIS DAMS
DREDGING
FLOOD HAZARDS
GEOLOGIC HAZARDS
HYDROLOGY — IMPACTS OF THE
ERUPTIONS ON WATER QUALITY

TOUTLE RIVER SYSTEM — ENGINEERING
GEOLOGY
TUNNELS
VOLCANIC ASH — ENGINEERING
ASPECTS

ENVIRONMENTAL IMPACT STATEMENTS

Erosion

see

GEOMORPHOLOGY
VOLCANIC ASH — EROSION

Eruption history

see

CHRONOLOGY AND HISTORY BEFORE
1980
CHRONOLOGY OF THE 1980 ERUPTION
ACTIVITY

ERUPTION PREDICTION

Fargher Lake, *see* LAKES — FARGHER LAKE

Fawn Lake, *see* LAKES — FAWN LAKE

Financial effects, *see* ECONOMIC EFFECTS

Findley Lake, *see* LAKES — FINDLEY LAKE

Fish, *see* BIOLOGY — FAUNA — AQUATIC

FLOOD HAZARDS

see also

ENGINEERING GEOLOGY
GEOLOGIC HAZARDS

Forestry, *see* BIOLOGY — FLORA —
FORESTRY

FUMARoles

GENERAL WORKS

Note: Includes materials, whether scientific or popular
works, which are overall descriptions of Mount St.
Helens.

GENERAL WORKS (BEFORE 1980)

GENERAL WORKS (1980 AND POST 1980)

GENERAL WORKS (1980) — PICTORIAL

Geochemistry

see

IGNEOUS PETROLOGY —
GEOCHEMISTRY
LAKES — GEOCHEMISTRY
MASS MOVEMENTS — LAHARS AND
MUDFLOWS — GEOCHEMISTRY
VOLCANIC ASH — GEOCHEMISTRY
VOLCANIC GASES — GEOCHEMISTRY
VOLCANIC PLUME — GEOCHEMISTRY

GEOCHRONOLOGY

see also

CHRONOLOGY AND HISTORY BEFORE
1980
CHRONOLOGY OF THE 1980 ERUPTIVE
ACTIVITY

GEOLOGIC HAZARDS

see also

DEBRIS DAMS
ENGINEERING GEOLOGY
FLOOD HAZARDS
MASS MOVEMENTS — LAHARS AND
MUDFLOWS

GEOLOGIC HAZARDS (BEFORE 1980)

GEOLOGIC HAZARDS (1980)

GEOLOGIC HAZARDS (POST 1980)

Geologic hazards — Social aspects, *see* SOCIAL
ASPECTS

Geologic maps, *see* MAPS — GEOLOGIC

GEOMORPHOLOGY

see also

MASS MOVEMENTS — AVALANCHES AND
LANDSLIDES

MASS MOVEMENTS — LAHARS AND
MUDFLOWS

RIVER MORPHOLOGY

VOLCANIC ASH — EROSION

Geophysical maps, *see* MAPS — GEOPHYSICAL

GEOPHYSICS [GENERAL WORKS]

Geophysics — Acoustics, *see* BLAST —
ACOUSTICS

GEOPHYSICS — ELECTRICAL SURVEYS

GEOPHYSICS — GRAVITY SURVEYS

GEOPHYSICS — MAGNETIC SURVEYS

GEOPHYSICS — RADIOACTIVITY SURVEYS

GEOPHYSICS — SEISMIC SURVEYS

GEOPHYSICS — THERMAL SURVEYS

see also

BLAST — THERMAL SURVEYS
GEOTHERMAL RESOURCES

GEOPHYSICS — TILT SURVEYS

GEOTHERMAL RESOURCES

see also GEOPHYSICS — THERMAL
SURVEYS

Gifford Pinchot National Forest

Note: The 1980 eruption of Mount St. Helens impacted much of the Gifford Pinchot National Forest (which includes most of Skamania County and the eastern part of Lewis County). See specific aspects, e. g.,

BLAST
HYDROLOGY
LAKES

MASS MOVEMENTS — AVALANCHES AND
LANDSLIDES

MASS MOVEMENTS — LAHARS AND
MUDFLOWS

GLACIER AND SNOW SURVEYS

Gold, *see* MINERAL RESOURCES

Gravity surveys, *see* GEOPHYSICS —
GRAVITY SURVEYS

GREEN RIVER

GUIDEBOOKS

see also

COWLITZ RIVER — GUIDEBOOKS
STUDY GUIDES

TOUTLE RIVER SYSTEM — GUIDEBOOKS

Hazards, *see* GEOLOGIC HAZARDS

HEALTH EFFECTS

History, *see* CHRONOLOGY AND HISTORY
BEFORE 1980

Human effects, *see* SOCIAL ASPECTS

HYDROLOGY

see also

COWLITZ RIVER — HYDROLOGY
DEBRIS DAMS

DREDGING

FLOOD HAZARDS

LAKE SEDIMENTS

LAKES

LIMNOLOGY

RIVER MORPHOLOGY

STREAM SEDIMENTS

TOUTLE RIVER SYSTEM — HYDROLOGY

see also

Names of rivers, creeks, and watersheds

HYDROLOGY — IMPACTS OF THE
ERUPTIONS

HYDROLOGY — IMPACTS OF THE
ERUPTIONS ON MUNICIPAL WATER
SYSTEMS

HYDROLOGY — IMPACTS OF THE
ERUPTIONS ON WATER QUALITY

IGNEOUS PETROLOGY (BEFORE 1980)

IGNEOUS PETROLOGY (1980 AND POST 1980)

IGNEOUS PETROLOGY — GEOCHEMISTRY
(BEFORE 1980)

IGNEOUS PETROLOGY — GEOCHEMISTRY
(1980 AND POST 1980)

IGNEOUS PETROLOGY — PHYSICAL
MEASUREMENTS

INDIAN HEAVEN AREA

Insects, *see* BIOLOGY — FAUNA —
TERRESTRIAL

IRON CREEK

KALAMA RIVER VALLEY

Lake Lenore, *see* LAKES — LAKE LENORE

LAKE SEDIMENTS

Lake Washington, *see* LAKES — LAKE
WASHINGTON

Lakes — Biological aspects, *see* LIMNOLOGY

LAKES — BUMPING LAKE

Lakes — Clark Co., Wash., *see* LAKES —
FARGHER LAKE

LAKES — COLDWATER LAKE

LAKES — COWLITZ CO., WASH.

see also

LAKES — COLDWATER LAKE

LAKES — FAWN LAKE

LAKES — MCBRIDE LAKE

LAKES — MERRILL LAKE

LAKES — SILVER LAKE

LAKES — DAVIS LAKE

LAKES — FARGHER LAKE

LAKES — FAWN LAKE

LAKES — FINDLEY LAKE

Lakes — Geochemistry, *see* LIMNOLOGY

Lakes — Grant Co., Wash.

see

LAKES — LAKE LENORE

LAKES — SOAP LAKE

Lakes — King Co., Wash., *see* LAKES — LAKE
WASHINGTON

LAKES — LAKE LENORE

LAKES — LAKE WASHINGTON

Lakes — Lewis Co., Wash., *see* LAKES —
DAVIS LAKE

LAKES — MCBRIDE LAKE

LAKES — MERRILL LAKE

LAKES — META LAKE

LAKES — NORTH COLDWATER LAKE

LAKES — RYAN LAKE

LAKES — ST. HELENS LAKE

LAKES — SILVER LAKE

LAKES — SKAMANIA CO., WASH.

see also

LAKES — COLDWATER LAKE

LAKES — META LAKE

LAKES — RYAN LAKE

LAKES — ST. HELENS LAKE

LAKES — SOUTH FORK CASTLE CREEK
LAKE

LAKES — SPIRIT LAKE

LAKES — SOAP LAKE

LAKES — SOUTH FORK CASTLE CREEK
LAKE

LAKES — SPIRIT LAKE

LAKES — SPOKANE CO., WASH.,

see also

LAKES — FINDLEY LAKE

LAKES — WILLIAMS LAKE

LAKES — VENUS LAKE

LAKES — WEST CASTLE CREEK LAKE

LAKES — WILLIAMS LAKE

Lakes — Yakima Co., Wash., *see* LAKES —
BUMPING LAKE

Landfills, *see* VOLCANIC ASH —
ENGINEERING ASPECTS

Landslide-induced dams, *see* DEBRIS DAMS

Landslides, *see* MASS MOVEMENTS —
AVALANCHES AND LANDSLIDES

Lava tubes, *see* CAVES

LAWS AND LITIGATION

Legionnaire's Disease *see* HEALTH EFFECTS

LEWIS RIVER

LIMNOLOGY

Machine effects, *see* VOLCANIC ASH —
MACHINE EFFECTS

MAGMA CHAMBER

Magnetic surveys, *see* GEOPHYSICS —
MAGNETIC SURVEYS

MAPS — GEOLOGIC

MAPS — GEOPHYSICAL

MAPS — PHYSIOGRAPHIC DIAGRAMS

MAPS — TOPOGRAPHIC

Note: The various standard topographic maps of the Mount St. Helens area prepared by the U.S. Geological Survey over the years have not been included in this index.

see also TOPOGRAPHY

**MASS MOVEMENTS — AVALANCHES AND
LANDSLIDES**

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS [GENERAL WORKS]**

Mass movements — Lahars and mudflows —
Biological effects, *see* BIOLOGY

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS — COLUMBIA RIVER**

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS — COWLITZ RIVER**

Mass Movements — Lahars and mudflows —
Economic effects, *see* ECONOMIC EFFECTS

Mass movements — Lahars and mudflows —
Geochemistry, *see* HYDROLOGY — IMPACTS
OF THE ERUPTIONS ON WATER QUALITY

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS — LEWIS RIVER**

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS — MUDDY RIVER**

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS — PHYSICAL PROCESSES**

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS — PINE CREEK**

**MASS MOVEMENTS — LAHARS AND
MUDFLOWS — TOUTLE RIVER SYSTEM**

McBride Lake, *see* LAKES — MCBRIDE LAKE

MERCURY

Merrill Lake, *see* LAKES — MERRILL LAKE

Meta Lake, *see* LAKES — META LAKE

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MINERALOGY

see also VOLCANIC ASH — MINERALOGY

**MOUNT ST. HELENS NATIONAL VOLCANIC
MONUMENT**

MOUNT ST. HELENS SEISMIC ZONE

see also EARTHQUAKES AND
SEISMOLOGY

MUDDY RIVER

Mudflows, *see* MASS MOVEMENTS —
LAHARS AND MUDFLOWS

National Volcanic Monument, *see* MOUNT ST.
HELENS NATIONAL VOLCANIC
MONUMENT

North Coldwater Lake, *see* LAKES — NORTH COLDWATER LAKE

Nuclear facilities, *see* TROJAN NUCLEAR SITE [OREGON]

Petrology, *see* IGNEOUS PETROLOGY

Physiographic diagrams, *see* MAPS — PHYSIOGRAPHIC DIAGRAMS

Pictorial works, *see* GENERAL WORKS (1980) — PICTORIAL

PINE CREEK AND PINE CREEK BASIN

PINE CREEK ASSEMBLAGE

PLANNING

see also EMERGENCY RESPONSE

Plants, *see* BIOLOGY — FLORA

Plate tectonics, *see* STRUCTURAL GEOLOGY

Plume, *see* VOLCANIC PLUME

Prediction of eruption, *see* ERUPTION PREDICTION

PYROCLASTIC FLOWS AND DEPOSITS (BEFORE 1980)

PYROCLASTIC FLOWS AND DEPOSITS (1980)

PYROCLASTIC FLOWS AND DEPOSITS (POST 1980)

Quaternary,

see

GEOCHRONOLOGY
VOLCANIC ASH — STRATIGRAPHY

Radioactivity surveys, *see* GEOPHYSICS — RADIOACTIVITY SURVEYS

Radiocarbon dating, *see* GEOCHRONOLOGY

REMOTE SENSING

see also GEOPHYSICS

RIVER MORPHOLOGY

Rivers — Biological effects, *see* LIMNOLOGY

Ryan Lake, *see* LAKES — RYAN LAKE

St. Helens Lake, *see* LAKES — ST. HELENS LAKE

St. Helens mining district, *see* MINERAL RESOURCES

Sediments

see

LAKE SEDIMENTS
MASS MOVEMENTS — AVALANCHES AND LANDSLIDES
MASS MOVEMENTS — LAHARS AND MUDFLOWS
SOILS
STREAM SEDIMENTS
VOLCANIC ASH

Seismic surveys, *see* GEOPHYSICS — SEISMIC SURVEYS

Seismology, *see* EARTHQUAKES AND SEISMOLOGY

SHULTZ CREEK

Silver, *see* MINERAL RESOURCES

Silver Lake, *see* LAKES — SILVER LAKE

Skamania Co.

Note: The 1980 eruption of Mount St. Helens impacted much of Skamania County. *See* specific aspects, e.g.:

HYDROLOGY
MASS MOVEMENTS — AVALANCHES AND LANDSLIDES
MASS MOVEMENTS — LAHARS AND MUDFLOWS
VOLCANIC ASH — DISTRIBUTION

SMITH CREEK

Snow surveys, *see* GLACIER AND SNOW SURVEYS

Soap Lake, *see* LAKES — SOAP LAKE

SOCIAL ASPECTS

SOILS

see also VOLCANIC ASH — SOIL EFFECTS

South Fork Castle Creek Lake, *see* LAKES —
SOUTH FORK CASTLE CREEK LAKE

Spirit Lake, *see* LAKES — SPIRIT LAKE

Spirit Lake outlet tunnel, *see* TUNNELS

SQUAW CREEK

STRATIGRAPHY

see also VOLCANIC ASH —
STRATIGRAPHY

STREAM SEDIMENTS, *see also* MASS
MOVEMENTS — LAHARS AND MUDFLOWS

STREAM SEDIMENTS (1980)

STREAM SEDIMENTS (POST 1980)

Stream sediments — Biological aspects, *see*
BIOLOGY

STRUCTURAL GEOLOGY

STUDY GUIDES

see also GUIDEBOOKS

SWIFT CREEK

SWIFT CREEK ASSEMBLAGE

SWIFT RESERVOIR

Tectonics, *see* STRUCTURAL GEOLOGY

Tephra,

see

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