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# AGES OF ROCKS IN SOUTHWESTERN WASHINGTON AND NORTHWESTERN OREGON AS INDICATED BY PALEONTOLOGICAL AND ISOTOPIC DATES

by

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## INTRODUCTION

This report presents a compilation of 1,019 paleontologic dates and 301 isotopic dates of rocks in southwestern Washington and northwestern Oregon. The study area extends from Portland, Oregon (latitude 45°30' N.) to Bellevue, Washington (latitude 47°35' N.) and from the east flank of the Cascade Range (longitude 121°20' W.) to the coastline (longitude approximately 124°00' W.). The data are presented in two tables and come from previous summaries of isotopic ages, open-file reports, published papers and maps, and theses. Parke D. Snavely, Jr. of the U.S. Geological Survey and Weldon W. Rau of the Washington Division of Geology and Earth Resources (WDGER) generously allowed us access to files and records of more than 40 years of micropaleontological research in western Washington and Oregon. We also present unpublished data from our research since 1971 in northwestern Oregon. This compilation was undertaken for the southwestern Washington and northwestern Oregon project of the U.S. Geological Survey Evolution of Sedimentary Basins Program.

Data compilation was completed in only three months and, therefore, some available data may have been overlooked. We would appreciate being contacted about omissions through: Wendy A. Niem, Department of Geosciences, Oregon State University, Wilkinson Hall 104, Corvallis, OR 97331-5506.

Sample locations were plotted as accurately as possible given the limitations of the scale of the base map or the scale of the map on which the data were reported. Cross references are provided for many localities.

Age determinations are presented as they were published in the source reference. In 1976, the IUGS Subcommission on Geochronology recommended a new set of decay and abundance constants for calculation of K/Ar ages. Therefore, K/Ar analyses published prior to 1976 have been recalculated using the conversion tables of Dalrymple (1979). The recalculated dates are presented in the comments column. Most isotopic dates included in this report were derived by K/Ar analysis; others were determined by uranium-lead (U/Pb), lead-alpha (Pb-alpha), fission track (F-T), $^{40}Ar/^{39}Ar$ (Ar/Ar), or $^{14}$carbon (C-14) analysis.

Paleontological research in western Washington and Oregon has been published in the geological literature for more than 140 years. Exposures in many areas have been examined several times by researchers with increasingly refined schemes of paleontological zonation for the Pacific Northwest. Many investigators have attempted to correlate Pacific Northwest faunas with the well-studied and defined molluscan and foraminiferal zones of California. Therefore, this summary mainly presents data reported since 1950, although a few older references are cited.

In some areas, the sampling and research has been so intensive and has been conducted by so many paleontologists that only a relatively small number of sample locations are shown on the map (Plate I). Some of these areas are the Green River canyon, area, WA (T. 21 N., R. 7 E.), the Wishkah River area, WA (T. 19 and 20 N., R. 8 and 9

W.), the Satsop River area, WA (T. 20 and 21 N., R. 6 and 7 W.), the Chehalis River area, WA (T. 15, 16, and 17 N., R. 3, 4, and 5 W.), the Cowlitz River area, WA (T. 10 and 11 N., R. 1 and 2 W.), the Astoria, Oregon area (T. 8 N., R. 9 W.), the Vernonia-Pittsburg, Oregon area (T. 3, 4, and 5 N., R. 4 and 5 W.), and the Rock Creek area, OR (T. 4 and 5 N., R. 5 W.).

## Map and Sample Numbers

Numbering of localities (Map No.) on each of the two plates begins with 1 at the northwesternmost locality and continues consecutively eastward across a tier of one to three townships, resumes at the western end of the next township to the south, and continues in this pattern southward down the map. A few localities, however, are out of numerical order. On Plate I, these localities include numbers 997, 998, and 999 (which are in T. 7 N., R. 6 W.), 1000 and 1001 (which are in T. 4 N., R. 9 W.), 1002 (which is in T. 3 N., R. 9 W.), and 1012 through 1019 (which are in T. 11 and 12 N., R. 6 and 7 W). On Plate II, locality numbers 127 (in T. 15 N., R. 9 W.), 132 (in T. 6 N., R. 1 W.), 299 (in T. 15 N., R. 7 W.), 300 (in T. 16 N., R. 5 W.), and 301 (in T. 18 N., R. 4 W.) are not in numerical order. Sample numbers are those used by the source reference.

## Location

Sample locations in Tables 1 and 2 are listed both by latitude and longitude and by township and range. The township and range grid in the study area is based on the Willamette Meridian and Willamette Baseline. Latitude and longitude for each locality are listed as they are given in the source reference or as read to the nearest 5 seconds (5"). In some cases, the location is given to the nearest 2 seconds (2"). All locations were plotted manually by the first author. The appropriate 7.5-minute U.S.G.S. topographic quadrangle is also listed for each locality. Topographic or orthophotoquad maps are presently available for most, but not all, of these quadrangles. Seven and a half-minute topographic maps should become available for all listed quadrangles within the next several years.

## Geologic Unit

The two data tables provide paleontological and isotopic dates for southwestern Washington and northwestern Oregon. Therefore, the geologic units include both sedimentary and igneous (both extrusive and intrusive) units. For sedimentary formations, we list the unit name used by the original author in the source reference and/or by more recent workers. Some authors used informal unit names. Where an informal unit name has been superseded by a formal name, we list the formal name in the geologic unit column and provide the informal unit name from the source reference in the comments column. The stratigraphic nomenclature generally conforms to Hull and others (1988). Readers may also wish to refer to a geologic map of the Astoria basin (Niem and Niem, 1985) for current stratigraphic nomenclature of northwestern Oregon. Some extrusive units are very young (less than 1 Ma) and have informal field names (listed here) which may not be recognized by the U.S. Geological Survey Geologic Names Committee.

The Tertiary sedimentary rocks of southwestern Washington and northwestern Oregon accumulated in a complex convergent margin setting and are characterized by rapid facies changes. As a result, the nomenclature can be confusing. Formational units which are separated into members in one area may be undifferentiated in another area. For example, Niem and Niem (1985) and A. R. Niem's graduate students at Oregon State University have distinguished members of the Astoria Formation in northwestern Oregon.

However, in southwestern Washington, time-equivalent and slightly younger strata are called the Astoria(?) Formation by most workers.

Most of the paleontological data summarized in this report are from foraminiferal research. The preponderance of foraminiferal data reflects the large volume of marine fine-grained sandstone, siltstone, or mudstone. Readers will note that many of the sample localities are along streams where runoff removes weathered rock and exposes "fresh" rock which yields identifiable paleontological specimens.

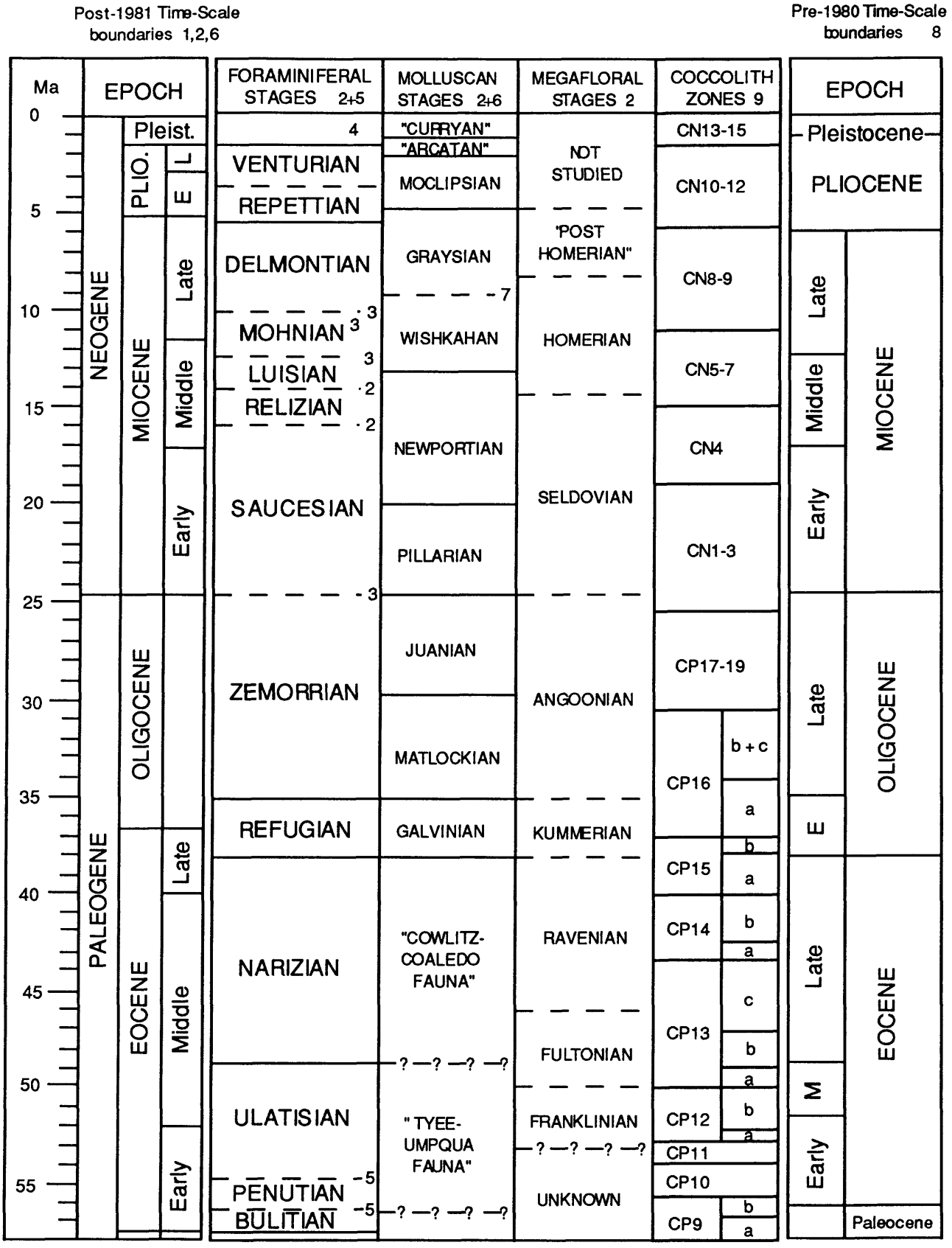
Paleontological data from mollusks, coccoliths, diatoms, fossil floras, and vertebrate remains are also reported. The type of fossil fauna or flora on which the date at each locality is based is indicated in the comments column. Several publications report subsurface paleontological information, especially in northwestern Oregon related to the Mist Gas Field. These subsurface age data are not included in this report.

## Dates

The paleontological and isotopic data are presented in slightly different formats. Following the columns for map no., sample no. (as used in the source reference), location data, and geologic unit, the paleontological data table provides the Tertiary epoch, stage, and zone (where known). The Tertiary epochs listed in the epoch column are those reported in the source reference. In 1981, Armentrout published a major revision of the relative positions of many of the microfossil and megafossil stages and zones relative to the Tertiary epochs and absolute dates. The absolute age of the Eocene/Oligocene boundary has been modified since Armentrout's 1981 paper by Montanari and others (1985) and by Berggren and others (1985). In addition, Prothero and Armentrout (1985) correlated the foraminiferal and molluscan biostratigraphy of southwestern Washington to the global marine chronology. The reader should refer to these papers and to Armentrout (1981), Niem and Niem (1985), and Hull and others (1988) for these revisions, particularly for dates from pre-1981 sources. Figure 1 provides a correlation of Pacific Northwest benthonic foraminiferal, molluscan, and megafloral stages and coccolith zones to the absolute and relative time scales for the Tertiary. The column labeled "Pre-1981 Time-Scale boundaries" shows the chrono-stratigraphy used by studies prior to 1981. For example, prior to 1981, the Refugian foraminiferal stage was correlative to the early Oligocene. In current usage, the Refugian is regarded as late Eocene and early Oligocene. For paleontological studies published prior to 1981, the correlative epoch based on the revised Tertiary geochronology is listed in the comments column if the source reference provided sufficient information to make this correlation.

The isotopic data are arranged in similar style to the paleontological data. Following the columns for map no., sample no. (as used in the source reference), location data, and geologic unit, the isotopic data table lists the date (in Ma), standard deviation, material dated (e.g., whole rock, zircon), and analytical method. For very young material dated by carbon-14 analysis, the date is listed in years rather than millions of years. The reader should refer to the source reference in order to examine other analytical data that would assist in evaluating this listed date. The concluding columns for both tables are source reference, other works in which this date is cited, and comments. Absolute ages can be correlated to the post-1981 relative time scale and microfossil and megafossil stages on Figure 1.

We strongly recommend that readers check and independently evaluate the source reference before citing any information included in this report.




1 after Berggren and others (1985) 2 after Armentrout (1981) 3 after Rau (1981)
4 Foraminiferal stages of the Pleistocene include the Hallian and underlying Wheelerian.(from Rau, 1981)
5 after "Mallory emended" *in* Almgren and others (1988) 6 modified by Prothero and Armentrout (1985)
7 after Addicott (1981) 8 after Snavely and others (1969) and Addicott (1976) 9 after Bukry (1981)

Figure 1 Correlation of relative and absolute time-scales for Cenozoic rocks in southwestern Washington and northwestern Oregon.

Table 1. Paleontological Dates in Southwestern Washington and Northwestern Oregon (abbreviations used in this table: USNM = US National Museum; WDGER = Washington Division of Geology and Earth Resources)

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0001 | F-15 | 47°38'45" | 124°23'15" | Hoh rock assemblage - massive graywacke sandstone | Eocene, Oligocene(?) and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample localities S704, S790, S791)) |
| 0002 | F-16 | 47°38' | 124°23' | Hoh rock assemblage - thick graywacke sandstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S881) |
| 0003 | F-17 | 47°37'50" | 124°16'05" | Hoh rock assemblage | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S883) |
| 0004 | F-18 | 47°35'50" | 124°17' | Hoh rock assemblage, thick graywacke sandstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S876) |
| 0005 | F-19 | 47°35'00" | 124°17'45" | Hoh rock assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | |
| 0006 | F-21 | 47°34'25" | 124°17'10" | Hoh lithic assemblage - siltstone | Miocene | Saucesian | --- | Rau (1975) | Tabor and Cady (1978, sample locality S901) |
| 0007 | F-20 | 47°34'22" | 124°17'30" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S908) |
| 0008 | F-22 | 47°34'05" | 124°17'50" | Hoh lithic assemblage - rhythmite sequences | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S871) |
| 0009 | F-23 | 47°33'50" | 124°17'55" | Hoh lithic assemblage - rhythmite sequences | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample localities S787 & 835) |
| 0010 | F-29 | 47°32'00" | 124°19'30" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S877) |
| 0011 | F-28 | 47°32'52" | 124°19'15" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S875) |
| 0012 | F-27 | 47°32'35" | 124°18'30" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S878) |
| 0013 | F-26 | 47°32'52" | 124°17'50" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S874) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0001 | Destruction Island 7.5-min. | Jefferson | NE NW | 28 | 25 N. | 13 W. | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0002 | Destruction Island 7.5-min. | Jefferson | NW NE | 33 | 25 N. | 13 W. | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0003 | Kalaloch Ridge 7.5-min. | Jefferson | NE | 32 | 25 N. | 12 W. | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0004 | Queets 7.5-min. | Jefferson | NE SE | 7 | 24 N. | 12 W. | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0005 | Queets 7.5-min. | Jefferson | NW SW | 18 | 24 N. | 12 W. | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0006 | Queets 7.5-min. | Jefferson | NE NE | 19 | 24 N | 12 W | foraminifers; according to Armentrout (1981) Saucesian benthonic foraminiferal stage is equivalent to the early to middle Miocene |
| 0007 | Queets 7.5-min. | Jefferson | NE NW | 19 | 24 N | 12 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0008 | Queets 7.5-min. | Jefferson | NW SW | 19 | 24 N | 12 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0009 | Queets 7.5-min. | Jefferson | SW SW | 19 | 24 N | 12 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0010 | Queets 7.5-min. | Jefferson | SE SE | 35 | 24 N | 13 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0011 | Queets 7.5-min. | Jefferson | NE NE | 35 | 24 N | 13 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0012 | Queets 7.5-min. | Jefferson | SW NE | 36 | 24 N | 13 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0013 | Queets 7.5-min. | Jefferson | NW NW | 31 | 24 N | 12 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0014 | F-25 | 47°32'57" | 124°16'30" | Hoh lithic assemblage - siltstone | Miocene - early | Saucesian | --- | Rau (1975) | Tabor and Cady (1978, sample localities S872, 786, & 838) |
| 0015 | F-24 | 47°33'25" | 124°16'05" | Hoh lithic assemblage - rhythmite sequences | Miocene - early | Saucesian | --- | Rau (1975) | Tabor and Cady (1978, sample localities S873 & 851) |
| 0016 | F-30 | 47°29'10" | 124°15'45" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S782) |
| 0017 | F-33 | 47°28'10" | 124°20'25" | Hoh lithic assemblage - siltstone | Miocene - middle | Saucesian - late to Relizian, possibly | *Rotalia becki* | Rau (1975) | Tabor and Cady (1978, sample localities S780, 820, 821, 822) |
| 0018 | F-34 | 47°27'18" | 124°20'15" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample localities S723, 819, 880) |
| 0019 | F-35 | 47°27'15" | 124°19'00" | Hoh lithic assemblage - siltstone | Miocene - middle | Saucesian - late to Relizian, possibly | *Rotalia becki* | Rau (1975) | Tabor and Cady (1978, sample locality S795) |
| 0020 | F-36 | 47°26'52" | 124°20'15" | Hoh lithic assemblage - siltstone | Miocene -middle | Saucesian - late to Relizian, possibly | *Rotalia becki* | Rau (1975) | Tabor and Cady (1978, sample locality S818) |
| 0021 | F-37 | 47°26'45" | 124°20'17" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S784) |
| 0022 | F-38 | 47°26'10" | 124°20'12" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample localities S726 & 768) |
| 0023 | F-39 | 47°26'00" | 124°17'30" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S870) |
| 0024 | F-40 | 47°25'37" | 124°20'05" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S817) |
| 0025 | F-41 | 47°24'10" | 124°16'35" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S783) |
| 0026 | F-42 | 47°23'02" | 124°18'40" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S725) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0014 | Queets 7.5-min. | Jefferson | SW SW | 29 | 24 N | 12 W | foraminifers; diagnostic Saucesian benthonic foraminiferal assemblage. According to Armentrout (1981) Saucesian benthonic foraminiferal stage is equivalent to the early to middle Miocene. |
| 0015 | Queets 7.5-min. | Jefferson | SW NE | 29 | 24 N | 12 W | foraminifers; diagnostic Saucesian benthonic foraminiferal assemblage. According to Armentrout (1981) Saucesian benthonic foraminiferal stage is equivalent to the early to middle Miocene. |
| 0016 | Tunnel Island 7.5-min. | Grays Harbor | SW NW | 18 | 23 N | 12 W | foraminifers |
| 0017 | Tunnel Island 7.5-min. | Grays Harbor | SW NE | 21 | 23 N | 13 W | foraminifers |
| 0018 | Tunnel Island 7.5-min. | Grays Harbor | SW NE | 28 | 23 N | 13 W | foraminifers |
| 0019 | Tunnel Island 7.5-min. | Grays Harbor | center | 27 | 23 N | 13 W | foraminifers |
| 0020 | Tunnel Island 7.5-min. | Grays Harbor | SW SE | 28 | 23 N | 13 W | foraminifers |
| 0021 | Tunnel Island 7.5-min. | Grays Harbor | NW NE | 33 | 23 N | 13 W | foraminifers |
| 0022 | Tunnel Island 7.5-min. | Grays Harbor | SW SE | 33 | 23 N | 13 W | foraminifers |
| 0023 | Tunnel Island 7.5-min. | Grays Harbor | SE SE | 35 | 23 N | 13 W | foraminifers |
| 0024 | Tunnel Island 7.5-min. | Grays Harbor | SW NE | 4 | 22 N | 13 W | foraminifers |
| 0025 | Tunnel Island 7.5-min. | Grays Harbor | NE NW | 13 | 22 N | 13 W | foraminifers |
| 0026 | Tunnel Island 7.5-min. | Grays Harbor | NE NE | 22 | 22 N | 13 W | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0027 | F-43 | 47°22'35" | 124°19'15" | Hoh lithic assemblage - siltstone | Miocene - middle | Saucesian - late | *Siphogenerina branneri* | Rau (1975) | Tabor and Cady (1978, sample localities S923 through 927) |
| 0028 | F-45 and 46 | 47°22'28" | 124°19'16" | Hoh lithic assemblage - siltstone | Miocene - middle | Saucesian - late | *Siphogenerina branneri* | Rau (1975) | Tabor and Cady (1978, sample localities S869, 928, 929, 930, 931) |
| 0029 | F-47 | 47°21'05" | 124°17'00" | Hoh lithic assemblage - siltstone | Eocene, Oligocene(?), and Miocene | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S721) |
| 0030 | F-48 | 47°18'25" | 124°16'35" | Hoh lithic assemblage | Eocene - late | --- | --- | Rau (1975) | Tabor and Cady (1978, sample localities S788, 826) |
| 0031 | F-49 | 47°18'20" | 124°16'15" | Hoh lithic assemblage(?) - siltstone | Eocene - late | --- | --- | Rau (1975) | Tabor and Cady (1978, sample localities S823, 825) |
| 0032 | F-50 | 47°18'15" | 124°16'18" | Hoh lithic assemblage(?) - siltstone | Eocene - middle | --- | --- | Rau (1975) | Tabor and Cady (1978, sample locality S724) |
| 0033 | FS-6 | 47°29'15" | 123°56'50" | Undifferentiated rocks | --- | --- | "D" and "E" zones of California | Tabor and Cady (1978) | Harvey (1959), Appendix A |
| 0034 | FS - 13 | 47°27'45" | 123°51'35" | sandstone of SE core (Olympic Mts.) | Cretaceous - Upper to Eocene - lower | --- | "D", "E", and "C" zones of California | Tabor and Cady (1978) | Harvey (1959), Appendix A |
| 0035 | FS -12 | 47°28'25" | 123°50'15" | sandstone of SE core (Olympic Mts.) | --- | --- | "D", "E", and "C" zones of California | Tabor and Cady (1978) | Harvey (1959), Appendix A |
| 0036 | WDGER 8532 | 47°30'15" | 123°10'30" | --- | Eocene - middle | Ulatisian | --- | Rau (WDGER unpub. data) | |
| 0037 | WDGER 8538 | 47°34'30" | 122°25'00" | --- | Oligocene | Zemorrian | --- | Rau (WDGER unpub. data) | |
| 0038 | WDGER 8707 | 47°33'15" | 122°09'35" | --- | Eocene - late(?) | Refugian or Zemorrian | --- | Rau (WDGER unpub. data) | |
| 0039 | WDGER 8533 | 47°34'00" | 122°06'15" | --- | Oligocene | Zemorrian | --- | Rau (WDGER unpub. data) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0027 | Tunnel Island 7.5-min. | Grays Harbor | SW | 22 | 22 N | 13 W | foraminifers |
| 0028 | Taholah 7.5-min. | Grays Harbor | NW NW | 27 | 22 N | 13 W | foraminifers |
| 0029 | Taholah 7.5-min. | Grays Harbor | NW SW | 36 | 22 N | 13 W | foraminifers; age is based on numerous but scattered benthonic foraminifers which range from middle Eocene to middle Miocene (Relizian foraminiferal stage) in T. 21 to 26 N., R. 12 and 13 W. (Tabor and Cady, 1978; Rau, 1975) |
| 0030 | Taholah 7.5-min. | Grays Harbor | NE SW | 13 | 21 N | 13 W | foraminifers |
| 0031 | Taholah 7.5-min. | Grays Harbor | SE SE | 13 | 21 N. | 13 W. | foraminifers |
| 0032 | Taholah 7.5-min. | Grays Harbor | SW SE | 13 | 21 N. | 13 W. | foraminifers; sample from siltstone interbedded with volcanic rocks at Point Grenville |
| 0033 | Quinault Lake West 7.5-min. | Grays Harbor | SE NE | 16 | 23 N. | 10 W. | foraminifers |
| 0034 | Quinault Lake East 7.5-min. | Grays Harbor | SE SE | 19 | 23 N. | 9 W. | foraminifers |
| 0035 | Quinault Lake East 7.5-min. | Grays Harbor | NE NE | 20 | 23 N. | 9 W. | foraminifers |
| 0036 | Mt. Washington 7.5-min. | Mason | NE NW | 10 | 23 N. | 4 W. | foraminifers; collected by H.D. Gower. According to Armentrout (1981) Ulatisian benthonic foraminiferal stage is equivalent to early and middle Eocene. |
| 0037 | Duwamish Head 7.5-min. | King | NW NW | 15 | 24 N. | 3 E. | foraminifers; typical of the type Blakeley Fm. |
| 0038 | Mercer Island 7.5-min. | King | SE NW | 22 | 24 N. | 4 E. | foraminifers |
| 0039 | Issaquah 7.5-min | King | NE | 13 | 24 N. | 5 E. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0040 | USGS Paleobotany locality 9688 | 47°31'30" | 122°03'50" | Renton Formation | Oligocene | Kummerian - late | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0041 | USGS Paleobotany locality 9738 | 47°32'10" | 121°57'48" | Tukwila Fm. (upper part) | Eocene | Ravenian - late | --- | Wolfe (1968) | |
| 0042 | USGS Paleobotany locality 9730 | 47°27'30" | 122°04'40" | Renton Formation | Oligocene | Kummerian - late | --- | Wolfe (1968) | |
| 0043 | USGS Paleobotany locality 9686 | 47°29'20" | 121°56'40" | Tukwila Fm. (lower) | Eocene | Ravenian - early(?) | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0044 | USGS Paleobotany locality 9685 | 47°29'05" | 121°56'02" | Tukwila Fm. (lower) | Eocene | Ravenian - early(?) | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0045 | USGS Paleobotany locality 9814 | 47°29'02" | 121°55'35" | Tiger Mountain Formation | Eocene | Fultonian - late | --- | Wolfe (1968) | |
| 0046 | USGS Paleobotany locality 9813 | 47°27'58" | 121°55'00" | Tiger Mountain Formation | Eocene | Fultonian - late(?) | --- | Wolfe (1968) | |
| 0047 | USGS Paleobotany locality 9687 | 47°27'10" | 121°53'50" | Tukwila Fm. (sandstone bed C) | Eocene | Ravenian - early | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0048 | USGS Paleobotany locality 9815 | 47°26'12" | 121°58'10" | Tukwila Fm. (base of prominent volcanic breccia bed) | Eocene | Ravenian - late(?) | --- | Wolfe (1968) | |
| 0049 | USGS Paleobotany locality 9729 | 47°25'35" | 121°54'00" | Renton Formation | Eocene | Ravenian - late | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0050 | USGS Paleobotany locality 9695 | 47°21'52" | 121°59'00" | Puget Group (about 250 ft below McKay bed) | Eocene | Fultonian - late | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0051 | USGS Paleobotany locality 9842 | 47°22'00" | 121°58'05" | Puget Group (approx. 2,000 ft? below McKay bed) | Eocene | Franklinian(?) | --- | Wolfe (1968) | |
| 0052 | USGS Paleobotany locality 9731 | 47°21'12" | 121°54'45" | Puget Group (just below Cashman bed) | Eocene | Ravenian - late | --- | Wolfe (1968) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0040 | Issaquah 7.5-min. | King | SW NE | 32 | 24 N. | 6 E. | fossil plants; late Kummerian may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0041 | Fall City 7.5-min. | King | NE SW | 30 | 24 N. | 7 E. | fossil plants; late Ravenian may be correlative with the "Tejon" and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stage (Addicott, 1981) |
| 0042 | Fall City 7.5-min. | King | NW NW | 29 | 23 N. | 6 E. | fossil plants; late Kummerian may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0043 | Hobart 7.5-min. | King | SW SW | 8 | 23 N. | 7 E. | fossil plants; early Ravenian may be correlative with the "Transition" molluscan stage of Weaver and others (1944) which may be equivalent to the Ulatisian benthonic foraminiferal stage (Addicott, 1981) |
| 0044 | Hobart 7.5-min. | King | NE NE | 17 | 23 N. | 7 E. | fossil plants; early Ravenian may be correlative with the "Transition" molluscan stage of Weaver and others (1944) which may be equivalent to the Ulatisian benthonic foraminiferal stage (Addicott, 1981) |
| 0045 | Hobart 7.5-min. | King | NW NW | 16 | 23 N. | 7 E. | fossil plants; late Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0046 | Hobart 7.5-min. | King | SW NE | 21 | 23 N. | 7 E. | fossil plants; late Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0047 | Hobart 7.5-min. | King | SE NW | 27 | 23 N. | 7 E. | fossil plants; early Ravenian may be correlative with the "Transition" molluscan stage of Weaver and others (1944) which may be equivalent to the Ulatisian benthonic foraminiferal stage (Addicott, 1981) |
| 0048 | Hobart 7.5-min. | King | SW NW | 31 | 23 N. | 7 E. | fossil plants; late Ravenian may be correlative with the "Tejon" and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stages (Addicott, 1981) |
| 0049 | Hobart 7.5-min. | King | NW NE | 3 | 22 N. | 7 E. | fossil plants; late Ravenian may be correlative with the "Tejon" and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stages (Addicott, 1981) |
| 0050 | Cumberland 7.5-min. | King | NE SW | 25 | 22 N. | 6 E. | fossil plants; late Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0051 | Cumberland 7.5-min. | King | SE NW | 30 | 22 N. | 7 E. | fossil plants; Franklinian may be correlative with the "Capay" molluscan stage of Weaver and others (1944) which may be equivalent to the Bulitian benthonic foraminiferal stage (Addicott, 1981) |
| 0052 | Cumberland 7.5-min. | King | SE NE | 33 | 22 N. | 7 E. | fossil plants; late Ravenian may be correlative with the "Tejon" and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stages (Addicott, 1981) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0053 | USGS Paleobotany locality 9694 | 47°20'52" | 121°58'40" | Puget Group (between Ravensdale beds 3 and 4) | Eocene | Ravenian - early | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0054 | USGS Paleobotany locality 9732 | 47°20'40" | 121°50'55" | Puget Group (above Raven bed 4) | Eocene | Fultonian - late | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0055 | USGS Paleobotany locality 9735 | 47°20'15" | 121°51'00" | Puget Group (McKay bed) | Eocene | Ravenian - early | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0056 | PG 2930 | 47°19'00" (approx.) | 122°30'00" | Puget Group - lower Franklin coal zone | Eocene - middle to late | --- | *Platycarya* & *Bursera* concurrent-range zone | Newman (1981) | |
| 0057 | PG 800 (near USGS Paleobotany loc. 9675) | 47°19'15" (approx.) | 121°56'15" | Puget Group - lower (below Franklin sandstone) | Eocene - middle | --- | *Pistillipollenites* & *Platycarya* zone | Newman (1981) | |
| 0058 | PG 1400 (near USGS Paleobotany loc. 9840) | 47°19'12" (approx.) | 121°56'05" | Puget Group - lower middle (below Franklin coal zone) | Eocene - middle | --- | --- | Newman (1981) | |
| 0059 | USGS Paleobotany locality 9840 | 47°19'10" (approx.) | 121°56'05" | Puget Group (below Franklin bed 10) | Eocene | Franklinian | --- | Wolfe (1968) | |
| 0060 | USGS Paleobotany locality 9832 | 47°20'10" | 121°53'10" | Puget Group (just below Durham bed 1) | Eocene | Fultonian - late | --- | Wolfe (1968) | |
| 0061 | USGS Paleobotany localities 9675, 9676, 9677 | 47°19'05" (approx.) | 121°56'10" | Puget Group | Eocene | Franklinian | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0062 | PG 200 | 47°18'45" (approx.) | 121°56'15" | Puget Group - lower | Eocene - middle | --- | *Pistillipollenites* & *Platycarya* zone | Newman (1981) | |
| 0063 | PG 500 | 47°19'00" (approx.) | 121°55'50" | Puget Group - lower | Eocene - middle | --- | *Pistillipollenites* & *Platycarya* zone | Newman (1981) | |
| 0064 | USGS Paleobotany locality 9678 | 47°17'10" | 121°57'15" | Puget Group (immediately above Franklin bed 12) | Eocene | Fultonian - early | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0065 | PG 2500 | 47°18'00" | 121°57'12" | Puget Group - middle | Eocene - middle to late | --- | *Platycarya* & *Bursera* concurrent-range zone | Newman (1981) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0053 | Cumberland 7.5-min. | King | NE SE | 36 | 22 N. | 6 E. | fossil plants; early Ravenian may be correlative with the "Transition" molluscan stage of Weaver and others (1944) which may be equivalent to the Ulatisian benthonic foraminiferal stage (Addicott, 1981) |
| 0054 | Eagle Gorge 7.5-min. | King | SE SE | 36 | 22 N. | 7 E. | fossil plants; late Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0055 | Eagle Gorge 7.5-min. | King | SE NE | 1 | 21 N. | 6 E. | fossil plants; early Ravenian may be correlative with the "Transition" molluscan stage of Weaver and others (1944) which may be equivalent to the Ulatisian benthonic foraminiferal stage (Addicott, 1981) |
| 0056 | Black Diamond 7.5-min. (?) | King | --- | 11 | 21 N. | 6 E. | palynomorphs which Newman (1981) correlates to Narizian-Refugian foraminiferal stage |
| 0057 | Cumberland 7.5-min. | King | SE | 8 | 21 N. | 7 E. | palynomorphs which Newman (1981) correlates to Narizian foraminiferal stage |
| 0058 | Cumberland 7.5-min. | King | NE SE | 8 | 21 N. | 7 E. | palynomorphs |
| 0059 | Cumberland 7.5-min. | King | NE SE | 8 | 21 N. | 7 E. | fossil plants |
| 0060 | Cumberland 7.5-min. | King | NW SW | 2 | 21 N. | 7 E. | fossil plants; late Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0061 | Cumberland 7.5-min. | King | NE SE | 8 | 21 N. | 7 E. | fossil plants; Franklinian plant stage may be correlative with the "Capay" molluscan stage of Weaver and others (1944) which may be equivalent to the Bulitian benthonic foraminiferal stage (Addicott, 1981) |
| 0062 | Cumberland 7.5-min. | King | SE | 8 | 21 N. | 7 E. | palynomorphs which Newman (1981) correlates to Narizian foraminiferal stage |
| 0063 | Cumberland 7.5-min. | KIng | SW | 9 | 21 N. | 7 E. | palynomorphs which Newman (1981) correlates to Narizian foraminiferal stage |
| 0064 | Cumberland 7.5-min. | King | NE SE | 18 | 21 N. | 7 E. | fossil plants; early Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0065 | Cumberland 7.5-min. | King | SE | 18 | 21 N. | 7 E. | palynomorphs which Newman (1981) correlates to Narizian-Refugian foraminiferal stage |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0066 | PG 2050 (near USGS Paleobotany loc. 9833) | 47°17'50" | 121°57'15" | Puget Group (lower Franklin coal zone) | Eocene - middle to late | --- | --- | Newman (1981) | |
| 0067 | USGS Paleobotany locality 9833 | 47°17'50" | 121°57'15" | Puget Group (just above Franklin bed 10) | Eocene | Franklinian | --- | Wolfe (1968) | Wolfe (1961) |
| 0068 | USGS Paleobotany locality 9733 | 47°18'15" | 121°54'40" | Puget Group (Occidental bed 6) | Eocene | Fultonian - early | --- | Wolfe (1968) | |
| 0069 | USGS Paleobotany locality 9693 | 47°18'45" | 121°51'45" | Unnamed volcanic rocks | Oligocene | Kummerian - late | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0070 | USGS Paleobotany locality 9835 | 47°16'30" (approx.) | 122°01'15" | Puget Group (just above Gem bed) | Eocene | Ravenian - late | --- | Wolfe (1968) | |
| 0071 | PG 5600 (near USGS Loc. 9679) | 47°16'50" (approx.) | 121°59'40" | Puget Group - Kummer coal zone | Eocene - late to Oligocene | --- | --- | Newman (1981) | |
| 0072 | USGS Paleobotany locality 9679 | 47°16'50" (approx.) | 121°59'40" | Puget Group (about 150 ft below Kummer No. 3 bed) | Oligocene | Kummerian - early | --- | Wolfe (1968) | Newman (1981); Wolfe and others (1961) |
| 0073 | PG 6000 | 47°16'35" | 121°59'25" | Puget Group - Kummer coal zone | Eocene - late to Oligocene | --- | possibly near top of *Platycarya* zone | Newman (1981) | |
| 0074 | USGS Paleobotany locality 9834 | 47°16'42" | 121°59'12" | Puget Group (just below Kummer bed 5) | Oligocene | Kummerian - early | --- | Wolfe (1968) | |
| 0075 | PG 6550 (USGS Paleobotany loc. 9690) | 47°15'52" | 121°59'05" | volcanic rocks overlying Puget Group | Oligocene | --- | Palyn zones: *Gothanipollis* & *Elaeagnus* | Newman (1981) | |
| 0076 | PG 5300 | 47°16'50" | 121°58'35" | Puget Group - lower Kummer coal zone | Eocene - late | --- | --- | Newman (1981) | |
| 0077 | USGS Paleobotany locality 9691 | 47°17'15" | 121°57'58" | Puget Group | Eocene | Ravenian - late | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0078 | USGS Paleobotany locality 9680 | 47°17'32" | 121°58'17" | Puget Group (just below Kummer sandstone bed) | Eocene | Ravenian - late | --- | Wolfe (1968) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0066 | Cumberland 7.5-min. | King | NE NE | 19 | 21 N. | 7 E. | palynomorphs, which Newman (1981) correlates to Narizian foraminiferal stage |
| 0067 | Cumberland 7.5-min. | King | NE NE | 19 | 21 N. | 7 E | fossil plants; Franklinian may be correlative with the "Capay" molluscan stage of Weaver and others (1944) which may be equivalent to the Bulitian benthonic foraminiferal stage (Addicott, 1981) |
| 0068 | Cumberland 7.5-min. | King | NE SE | 16 | 21 N. | 7 E. | fossil plants; early Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0069 | Eagle Gorge 7.5-min. | King | NE NW | 13 | 21 N. | 7 E. | fossil plants; late Kummerian may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0070 | Black Diamond 7.5-min. | King | SE | 27 | 21 N. | 6 E. | fossil plants; late Ravenian may be correlative with the "Tejon" and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stage (Addicott, 1981) |
| 0071 | Cumberland 7.5-min. | King | NE | 26 | 21 N. | 6 E. | palynomorphs, which Newman (1981) correlates to the Refugian-Zemorrian foraminiferal stages |
| 0072 | Cumberland 7.5-min. | King | SE NE | 26 | 21 N. | 6 E. | fossil plants; early Kummerian may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0073 | Cumberland 7.5-min. | King | SW | 25 | 21 N. | 6 E. | palynomorphs, which Newman (1981) correlates to the Refugian-Zemorrian foraminiferal stages |
| 0074 | Cumberland 7.5-min. | King | NE SW | 25 | 21 N. | 6 E. | fossil plants; early Kummerian may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0075 | Cumberland 7.5-min | King | SE NW | 36 | 21 N. | 6 E. | palynomorphs; late Kummerian of Wolfe (1968) may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0076 | Cumberland 7.5-min. | King | NE | 25 | 21 N. | 6 E. | palynomorphs, which Newman (1981) correlates to the Refugian foraminiferal stage |
| 0077 | Cumberland 7.5-min. | King | SE SW | 19 | 21 N. | 7 E. | fossil plants; late Ravenian may be correlative with the "Tejon" and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stage (Addicott, 1981) |
| 0078 | Cumberland 7.5-min. | King | NW SW | 19 | 21 N. | 7 E. | fossil plants; late Ravenian may be correlative with the "Tejon" and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stage (Addicott, 1981) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0079 | PG 4600 (near USGS Paleobotany loc. 9680) | 47°17'32" | 121°58'17" | Puget Group - upper Franklin coal zone | Eocene - late | --- | --- | Newman (1981) | |
| 0080 | USGS Paleobotany locality 9692 | 47°17'35" | 121°52'55" | Puget Group | Eocene | Ravenian - late | --- | Wolfe (1968) | |
| 0081 | USGS Paleobotany locality 9734 | 47°16'45" | 121°55'25" | Puget Group (just above Navy bed 6) | Eocene | Fultonian - early | --- | Wolfe (1968) | |
| 0082 | USGS Paleobotany locality 9681 | 47°16'10" | 121°55'10" | Puget Group (about 200 ft below contact with unnamed volcanic rocks) | Oligocene | Kummerian - early | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0083 | USGS Paleobotany locality 9682 | 47°16'12" | 121°52'00" | Unnamed volcanic rocks | Oligocene | Kummerian - late | --- | Wolfe (1968) | Wolfe and others (1961) |
| 0084 | S1014 | 47°13'45" | 123°56'25" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0085 | S1103 | 47°13'50" | 123°56'05" | Humptulips Formation | Eocene - late | Refugian - Narizian | --- | Rau (1986) | |
| 0086 | S1101 | 47°16'15" | 123°51'55" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0087 | S1102 | 47°15'28" | 123°52'50" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0088 | S1104 | 47°15'00" | 123°53'00" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0089 | S997 | 47°14'58" | 123°53'15" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0090 | S995, S996 | 47°14'56" | 123°52'50" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0091 | S994 | 47°15'10" | 123°52'05" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0079 | Cumberland 7.5-min. | King | NW SW | 19 | 21 N. | 7 E. | palynomorphs, which Newman (1981) correlates to the Refugian foraminiferal stage |
| 0080 | Cumberland 7.5-min. | King | SE NW | 23 | 21 N. | 7 E. | fossil plants; late Ravenian may be correlative with the "Tejon"and lower part of "Keasey" molluscan stages of Weaver and others (1944) which may be equivalent to the Narizian benthonic foraminiferal stage (Addicott, 1981) |
| 0081 | Cumberland 7.5-min. | King | SW NE | 28 | 21 N. | 7 E. | fossil plants; early Fultonian may be correlative with the "Domengine" molluscan stage of Weaver and others (1944) which may be equivalent to the Penutian benthonic foraminiferal stage (Addicott, 1981) |
| 0082 | Cumberland 7.5-min. | King | NW NE | 33 | 21 N. | 7 E. | fossil plants; early Kummerian may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0083 | Eagle Gorge 7.5-min. | King | NW NW | 36 | 21 N. | 7 E. | fossil plants; late Kummerian may be correlative with the Galvinian molluscan stage (Armentrout, 1981) or late Eocene to Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0084 | Humptulips 7.5-min. | Grays Harbor | NW NW | 16 | 20 N. | 10 W. | foraminifers |
| 0085 | Humptulips 7.5-min. | Grays Harbor | SE SW | 9 | 20 N. | 10 W. | foraminifers |
| 0086 | Burnt Lake 7.5-min. | Grays Harbor | NE NE | 31 | 21 N. | 9 W. | foraminifers |
| 0087 | Stevens Creek 7.5-min. | Grays Harbor | NE NE | 2 | 20 N. | 10 W. | foraminifers |
| 0088 | boundary between Stevens Creek and Humptulips 7.5-min. | Grays Harbor | SW NE | 2 | 20 N. | 10 W. | foraminifers |
| 0089 | Humptulips 7.5-min. | Grays Harbor | NE SW | 2 | 20 N. | 10 W. | foraminifers |
| 0090 | Humptulips 7.5-min. | Grays Harbor | NE SE | 2 | 20 N. | 10 W. | foraminifers |
| 0091 | Burnt Hill 7.5-min. | Grays Harbor | W 1/2 NE | 1 | 20 N. | 10 W. | foraminifers; two samples with this no. in Rau (1986) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0092 | S993 | 47°14'55" | 123°51'35" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0093 | S1013, S986, S989, S990, S991 | 47°14'50" | 123°50'50" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0094 | S1000 | 47°14'45" | 123°50'20" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0095 | S1005, S1009 | 47°15'02" | 123°49'58" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0096 | S994, S1010 | 47°15'10" | 123°49'15" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0097 | S1011, S1012 | 47°15'20" | 123°48'35" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0098 | S1099 | 47°15'45" | 123°48'28" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0099 | S1098 | 47°15'45" | 123°47'50" | Humptulips Formation | Eocene - middle | Narizian - early | --- | Rau (1986) | |
| 0100 | S984, S985 | 47°14'10" | 123°46'52" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0101 | F-1 (S-595) | 47°14'45" | 123°42'58" | Sedimentary rocks of late Eocene age | Eocene - late | --- | --- | Rau (1967) | |
| 0102 | S1031, S1035, S1037 | 47°15'25" | 123°42'45" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0103 | S1034 | 47°16'40" | 123°42'00" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0104 | S1033 | 47°16'25" | 123°41'50" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0092 | Railroad Camp 7.5-min. | Grays Harbor | NE SE | 1 | 20 N. | 10 W. | foraminifers |
| 0093 | Railroad Camp 7.5-min. | Grays Harbor | E 1/2 | 6 | 20 N. | 9 W. | foraminifers |
| 0094 | Railroad Camp 7.5-min. | Grays Harbor | W 1/2 | 5 | 20 N. | 9 W. | foraminifers |
| 0095 | Bumt Hill 7.5-min. | Grays Harbor | SW NE | 5 | 20 N. | 9 W. | foraminifers |
| 0096 | Bumt Hill 7.5-min. | Grays Harbor | NE NE | 5 | 20 N. | 9 W. | foraminifers; there are two S994 in Rau (1986) |
| 0097 | Bumt Hill 7.5-min. | Grays Harbor | NE NW | 4 | 20 N. | 9 W. | foraminifers |
| 0098 | Bumt Hill 7.5-min. | Grays Harbor | SE | 34 | 21 N. | 9 W. | foraminifers |
| 0099 | Bumt Hill 7.5-min. | Grays Harbor | SW | 35 | 21 N. | 9 W. | foraminifers |
| 0100 | Railroad Camp 7.5-min. | Grays Harbor | center NE | 10 | 20 N. | 9 W. | foraminifers |
| 0101 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE SE | 6 | 20 N. | 8 W. | foraminifers |
| 0102 | Larsen Creek 7.5-min. | Grays Harbor | SW SW | 33 | 21 N. | 8 W. | foraminifers |
| 0103 | Larsen Creek 7.5-min. | Grays Harbor | SW NE | 28 | 21 N. | 8 W. | foraminifers |
| 0104 | Larsen Creek 7.5-min. | Grays Harbor | SE SE | 28 | 21 N. | 8 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0105 | S1029 | 47°15'25" | 123°38'30" | Humptulips Formation | Eocene - late | Narizian - highest | --- | Rau (1986) | |
| 0106 | S1030 | 47°17'10" | 123°38'45" | Humptulips Formation | Eocene - middle and late | Narizian | --- | Rau (1986) | |
| 0107 | F-2 (S-266) | 47°19'10" | 123°33'47" | Crescent Formation - sedimentary interbeds | Eocene - early to middle | Ulatisian | --- | Rau (1966) | |
| 0108 | F-3, -4 (S-269, -267) | 47°19'00" | 123°33'48" | Sedimentary rocks of late Eocene age | Eocene - late | Narizian | --- | Rau (1966) | |
| 0109 | F-5, -6 (S-268, -272) | 47°18'55" | 123°33'57" | Sedimentary rocks of late Eocene age | Eocene - late | Narizian | --- | Rau (1966) | |
| 0110 | F-7, -8, -9 (S-273, -274, -275) | 47°18'37" | 123°34'00" | Sedimentary rocks of late Eocene age | Eocene - late | Narizian | --- | Rau (1966) | |
| 0111 | F-10 through -14 (S-276 through -281) | 47°18'05" | 123°34'07" | Lincoln Creek Formation | Eocene - late | Refugian - early | *Sigmomorphina schencki* | Rau (1966) | |
| 0112 | F-15, -16, -17 (S-282, -283, -284, -285) | 47°17'40" | 123°34'15" | Lincoln Creek Formation | Oligocene - early | Refugian - late | *Cassidulina galvinensis* | Rau (1966) | |
| 0113 | F-18 (S-286) | 47°17'25" | 123°34'00" | Lincoln Creek Formation | Oligocene | Zemorrian - early | --- | Rau (1966) | |
| 0114 | WF-7 | 47°17'00" | 123°31'30" | Lincoln Creek Formation | Oligocene - middle | Matlockian - early | *Echinophoria rex* | Armentrout (1973) | |
| 0115 | F-19, -20, -21 (S-290, -291) | 47°16'55" | 123°33'52" | Lincoln Creek Formation | Oligocene | Zemorrian - early | --- | Rau (1966) | |
| 0116 | F-22 | 47°16'20" | 123°33'50" | Lincoln Creek Formation | Oligocene | Zemorrian - early | --- | Rau (1966) | |
| 0117 | F-23, -24, -25 (S-298, -299, -300) | 47°16'05" | 123°33'22" | Lincoln Creek Formation | Oligocene | Zemorrian - late | --- | Rau (1966) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0105 | Larsen Creek 7.5-min. | Grays Harbor | NE NW | 2 | 20 N. | 8 W. | foraminifers |
| 0106 | Larsen Creek 7.5-min. | Grays Harbor | NE NW | 25 | 21 N. | 8 W. | foraminifers |
| 0107 | Grisdale 7.5-min. | Grays Harbor | SW | 10 | 21 N. | 7 W. | foraminifers |
| 0108 | Grisdale 7.5-min. | Grays Harbor | SW SW | 10 | 21 N. | 7 W. | foraminifers. Unit is now called Humptulips Fm. (Rau, 1986). Narizian benthonic foraminiferal stage is considered middle and late Eocene (Armentrout, 1981). |
| 0109 | Grisdale 7.5-min. | Grays Harbor | NW NW | 15 | 21 N. | 7 W. | foraminifers. Unit is now called Humptulips Fm. (Rau, 1986). Narizian benthonic foraminiferal stage is considered middle and late Eocene (Armentrout, 1981). |
| 0110 | Grisdale 7.5-min. | Grays Harbor | W 1/2 | 15 | 21 N. | 7 W. | foraminifers. Unit is now called Humptulips Fm. (Rau, 1986). Narizian benthonic foraminiferal stage is considered middle and late Eocene (Armentrout, 1981). |
| 0111 | Grisdale 7.5-min. | Grays Harbor | SW SW | 15 | 21 N. | 7 W. | foraminifers; basal basaltic sandstone & concretionary tuffaceous siltstone |
| 0112 | Grisdale 7.5-min. | Grays Harbor | E 1/2 | 21 | 21 N. | 7 W. | foraminifers; tuffaceous siltstone & tuffaceous conglomerate |
| 0113 | Grisdale 7.5-min. | Grays Harbor | SW | 22 | 21 N. | 7 W. | foraminifers; massive siltstone |
| 0114 | Grisdale 7.5-min. | Grays Harbor | SW NW | 27 | 21 N. | 7 W. | mollusks; Armentrout's Olympian Stage; sample UW 1345; West Fork Satsop River section; Armentrout's (1973) *Echinophoria rex* zone in the "Blakeley" molluscan stage is equivalent to the early Matlockian molluscan stage. |
| 0115 | Grisdale 7.5-min. | Grays Harbor | SW NW | 27 | 21 N. | 7 W. | foraminifers; tuffaceous sandstone & sandy siltstone |
| 0116 | Grisdale 7.5-min. | Grays Harbor | NE NW | 34 | 21 N. | 7 W. | foraminifers; massive siltstone |
| 0117 | Grisdale 7.5-min. | Grays Harbor | SW NE | 34 | 21 N. | 7 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0118 | WF-19 | 47°15'35" | 123°33'15" | Lincoln Creek Formation | Oligocene - latest | Juanian | *Echinophoria apta* | Armentrout (1973) | |
| 0119 | WF-28 | 47°14'45" | 123°33'45" | Montesano Formation | Miocene - late | --- | --- | Armentrout (1973) | |
| 0120 | F-95 (S-313) | 47°14'25" | 123°33'40" | Montesano Formation | Miocene | Type Montesano | --- | Rau (1967) | |
| 0121 | F-36, -37, -38, -39 (S-340, -339, -338, -337) | 47°18'52" | 123°32'05" | Crescent Formation - sedimentary interbeds | Eocene - early to middle | Ulatisian | --- | Rau (1966) | |
| 0122 | F-40 through -50 (S-336 through -326) | 47°18'37" | 123°32'15" | Sedimentary rocks of late Eocene age | Eocene - late | Narizian | --- | Rau (1966) | |
| 0123 | F-51, -52 (S-324, -323) | 47°18'17" | 123°32'22" | Lincoln Creek Formation | Eocene - late | Refugian - early | *Sigmomorphina schencki* | Rau (1966) | |
| 0124 | F-53, -54 (S-322, -321) | 47°18'00" | 123°32'45" | Lincoln Creek Formation | Oligocene | Refugian - late | *Cassidulina galvinensis* | Rau (1966) | |
| 0125 | F-55, -56, -57 (S-319, -318, -317) | 47°17'35" | 123°33'00" | Lincoln Creek Formation | Oligocene | Zemorrian - early | --- | Rau (1966) | |
| 0126 | F-58, -59, -60 (S-316, -315, -314) | 47°16'52" | 123°32'55" | Lincoln Creek Formation | Oligocene | Zemorrian - late | --- | Rau (1966) | |
| 0127 | F-62, -63 (S-75, -77) | 47°18'37" | 123°30'05" | Crescent Formation - sedimentary interbeds | Eocene - early to middle | Ulatisian | --- | Rau (1966) | |
| 0128 | F-64 | 47°18'32" | 123°30'06" | Sedimentary rocks of late Eocene age | Eocene - late | Narizian | --- | Rau (1966) | |
| 0129a | F-65 through -69 (S-79 through -85) | 47°18'25" | 123°30'12" | Lincoln Creek Formation | Eocene - late | Refugian - early | *Sigmomorphina schencki* | Rau (1966) | |
| 0129b | B0253, B0254 | 47°18'25" | 123°30'12" | Lincoln Creek Formation | Eocene - late | --- | Calcareous nannofossil zones NP 19,20,21,22 | Armentrout and Worsley (1980) | Prothero and Armentrout (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0118 | Grisdale 7.5-min. | Grays Harbor | SW SE | 34 | 21 N. | 7 W. | mollusks; Armentrout's Olympian Stage; sample UW B1355; West Fork Satsop River section; Armentrout's (1973) *Echinophoria apta* zone in the "Blakeley" molluscan stage is equivalent to the Juanian molluscan stage. |
| 0119 | Wynoochee Valley NE 7.5-min. | Grays Harbor | NW SE | 4 | 20 N. | 7 W. | mollusks; sample UW B1364; West Fork Satsop River section |
| 0120 | Wynoochee Valley NE 7.5-min. | Grays Harbor | NW NE | 9 | 20 N. | 7 W. | foraminifers |
| 0121 | Grisdale 7.5-min. | Grays Harbor | NW NE | 14 | 21 N. | 7 W. | foraminifers |
| 0122 | Grisdale 7.5-min. | Grays Harbor | center N 1/2 to center W 1/2 | 14 | 21 N. | 7 W. | foraminifers. Unit is now called Humptulips Fm. (Rau, 1986). Narizian benthonic foraminiferal stage is considered middle and late Eocene (Armentrout, 1981). |
| 0123 | Grisdale 7.5-min. | Grays Harbor | SW | 14 | 21 N. | 7 W. | foraminifers |
| 0124 | Grisdale 7.5-min. | Grays Harbor | NW NW | 23 | 21 N. | 7 W. | foraminifers |
| 0125 | Grisdale 7.5-min. | Grays Harbor | SE | 22 | 21 N. | 7 W. | foraminifers |
| 0126 | Grisdale 7.5-min. | Grays Harbor | E 1/2 | 27 | 21 N. | 7 W. | foraminifers |
| 0127 | Dry Bed Lakes 7.5-min. | Mason | SE NW | 18 | 21 N. | 6 W. | foraminifers |
| 0128 | Dry Bed Lakes 7.5-min. | Mason | SE NW | 18 | 21 N. | 6 W. | foraminifers. Unit is now called Humptulips Fm. (Rau, 1986). Narizian benthonic foraminiferal stage is considered middle and late Eocene (Armentrout, 1981). |
| 0129a | Grisdale 7.5-min. | Mason | NW SW | 18 | 21 N. | 6 W. | foraminifers |
| 0129b | Grisdale 7.5-min. | Mason | NW SW | 18 | 21 N. | 6 W. | calcareous nannofossils (coccoliths) recovered from strata that yield Refugian benthonic foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0130 | F-70 through F-73 (S-86A through -89) | 47°18'15" | 123°30'30" | Lincoln Creek Formation | Eocene - late | Refugian - early | *Sigmomorphina schencki* | Rau (1966) | |
| 0131 | F-74 through -84 (S-90 through -102) | 47°18'00" | 123°30'35" | Lincoln Creek Formation | Oligocene | Refugian - late | *Cassidulina galvinensis* | Rau (1966) | |
| 0132 | F-85 through -98 (S-103 through -117) | 47°17'30" | 123°31'00" | Lincoln Creek Formation | Oligocene | Zemorrian - early | --- | Rau (1966) | |
| 0133 | CR-27 | 47°17'10" | 123°31'30" | Lincoln Creek Formation | Oligocene - latest | Juanian | *Echinophoria apta* | Armentrout (1973) | |
| 0134 | F-99 through -108 (S-118 through -132) | 47°16'50" | 123°31'45" | Lincoln Creek Formation | Oligocene | Zemorrian - late | --- | Rau (1966) | |
| 0135 | F-109 through -113 (S-133 through -138) | 47°16'40" | 123°31'22" | Lincoln Creek Formation | Oligocene | Zemorrian - late | --- | Rau (1966) | |
| 0136 | F-114 through -116 (S-140 through -145) | 47°16'15" | 123°31'22" | Lincoln Creek Formation | Oligocene | Zemorrian - late | --- | Rau (1966) | |
| 0137a | F-117 through -127 (S-147 through -164) | 47°16'00" | 123°31'15" | Astoria(?) Formation | Miocene - early to middle | Saucesian | --- | Rau (1966) | |
| 0137b | A1969, A1970, A1973, A1976, A1977, A1978, A1983, A1986, A1987 | 47°16'00" | 123°31'15" | Lincoln Creek Formation - upper and Astoria(?) Formation | Oligocene - late and Miocene - early | Juanian and Pillarian | *Liracassis apta* and *Vertipecten fucanus* | Thompson (1978) | |
| 0138 | F-94 (S-358) | 47°14'58" | 123°16'55" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0139 | F-139 through -144 (S-166 through -172) | 47°18'00" | 123°28'00" | Lincoln Creek Formation | Eocene - late | Refugian - early | *Sigmomorphina schencki* | Rau (1966) | |
| 0140 | F-145, -146 (S-173, -174) | 47°17'50" | 123°28'00" | Lincoln Creek Formation | Oligocene | Refugian - late | *Cassidulina galvinensis* | Rau (1966) | |
| 0141 | MF-1 | 47°18'00" | 123°28'35" | Lincoln Creek Formation | Eocene - latest | Galvinian - late | *Echinophoria dalli* | Armentrout (1973) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0130 | Grisdale 7.5-min. | Grays Harbor | SE SE | 13 | 21 N. | 7 W. | foraminifers |
| 0131 | Grisdale 7.5-min. | Grays Harbor | NE NE | 24 | 21 N. | 7 W. | foraminifers |
| 0132 | Grisdale 7.5-min. | Grays Harbor | SW | 24 | 21 N. | 7 W. | foraminifers |
| 0133 | Grisdale 7.5-min | Grays Harbor | NE NE | 26 | 21 N. | 7 W. | mollusks; Armentrout's Olympian Stage; sample UW B0305, B1313; Canyon River section; Armentrout's (1973) *Echinophoria apta* zone in the "Blakeley" molluscan stage is equivalent to the Juanian molluscan stage. |
| 0134 | Grisdale 7.5-min. | Grays Harbor | E 1/2 | 26 | 21 N. | 7 W. | foraminifers |
| 0135 | Grisdale 7.5-min. | Grays Harbor | SW | 25 | 21 N. | 7 W. | foraminifers |
| 0136 | Grisdale 7.5-min. | Grays Harbor | NW | 36 | 21 N. | 7 W. | foraminifers |
| 0137a | Grisdale 7.5-min. | Grays Harbor | SW | 36 | 21 N. | 7 W. | foraminifers; according to Armentrout (1981) Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene. |
| 0137b | Grisdale 7.5-min. | Grays Harbor | SW | 36 | 21 N. | 7 W. | mollusks. Thompson (1978) resampled Rau's (1966) Astoria(?) Fm. along the Canyon River. Molluscan assemblages from the lower muddy siltstone are late Oligocene; mollusks from the upper sandstone are early Miocene. |
| 0138 | Nahwatzel Lake 7.5-min. | Grays Harbor | SW NW | 2 | 20 N. | 7 W. | foraminifers |
| 0139 | Dry Bed Lakes 7.5-min. | Mason | NE NE | 20 | 21 N. | 6 W. | foraminifers |
| 0140 | Dry Bed Lakes 7.5-min. | Mason | NE | 20 | 21 N. | 6 W. | foraminifers |
| 0141 | Dry Bed Lakes 7.5-min. | Mason | NW NW | 20 | 21 N. | 6 W. | mollusks; Armentrout's Chehalian Stage; sample UW B0343; Middle Fork Satsop River section. Galvinian molluscan stage is correlative to late Eocene and early Oligocene according to Armentrout (1981) as modified by Prothero and Armentrout (1985). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0142 | F-147 through -154 (S-178 through -188) | 47°17'40" | 123°28'45" | Lincoln Creek Formation | Oligocene | Refugian - late | *Cassidulina galvinensis* | Rau (1966) | |
| 0143 | F-155 through -160 (S-190 through -196) | 47°17'05" | 123°28'55" | Lincoln Creek Formation | Oligocene | Zemorrian - early | --- | Rau (1966) | |
| 0144 | MF-14 | 47°16'55" | 123°28'50" | Lincoln Creek Formation | Oligocene - middle | Matlockian - early | *Echinophoria rex* | Armentrout (1973) | |
| 0145 | F-161 through -165 (S-197 through -204) | 47°16'35" | 123°29'05" | Lincoln Creek Formation | Oligocene | Zemorrian - late | --- | Rau (1966) | |
| 0146 | MF-17 | 47°16'30" | 123°28'50" | Lincoln Creek Formation | Oligocene - latest | Juanian | *Echinophoria apta* | Armentrout (1973) | |
| 0147 | F-169 through -185 (S-212 through -233) | 47°16'20" | 123°29'00" | Lincoln Creek Formation | Oligocene | Zemorrian - late | --- | Rau (1966) | |
| 0148 | MF-31 | 47°15'35" | 123°28'50" | Lincoln Creek Formation | Oligocene - latest | Juanian | *Echinophoria apta* | Armentrout (1973) | |
| 0149 | S1054 | 47°07'35" | 123°56'25" | Humptulips Formation | Eocene - middle | Narizian - early | --- | Rau (1986) | |
| 0150 | S1040 | 47°11'25" | 123°49'58" | Humptulips Formation | Eocene - late | Narizian | --- | Rau (1986) | |
| 0151 | S977, S979, S1039 | 47°11'45" | 123°45'55" | Lincoln Creek Formation | Oligocene | Zemorrian? or Refugian? | --- | Rau (1986) | |
| 0152 | S964, S970, S975 | 47°11'35" | 123°45'55" | Astoria(?) Formation | Miocene - early and middle | Saucesian | --- | Rau (1986) | |
| 0153 | S974, S976, S980 | 47°11'00" | 123°46'05" | Astoria(?) Formation | Miocene - early and middle | Saucesian | --- | Rau (1986) | |
| 0154 | S971 | 47°11'10" | 123°45'35" | Astoria(?) Formation | Miocene -early and middle | Saucesian | --- | Rau (1986) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0142 | Dry Bed Lakes 7.5-min. | Mason | NW SW | 20 | 21 N. | 6 W. | foraminifers |
| 0143 | Dry Bed Lakes 7.5-min. | Mason | NW | 29 | 21 N. | 6 W. | foraminifers |
| 0144 | Dry Bed Lakes 7.5-min. | Mason | SW NW | 29 | 21 N. | 6 W. | mollusks; Armentrout's Olympian Stage; sample UW B0373; Middle Fork Satsop River section; Armentrout's (1973) *Echinophoria rex* zone in the "Blakeley" molluscan stage is equivalent to the early Matlockian molluscan stage. |
| 0145 | Dry Bed Lakes 7.5-min. | Mason | SW | 29 | 21 N. | 6 W. | foraminifers |
| 0146 | Dry Bed Lakes 7.5-min. | Mason | SW SW | 29 | 21 N. | 6 W. | mollusks; Armentrout's Olympian Stage; sample UW B0383; Middle Fork Satsop River section; Armentrout's (1973) *Echinophoria apta* zone in the "Blakeley" molluscan stage is equivalent to the Juanian molluscan stage. |
| 0147 | Dry Bed Lakes 7.5-min. | Mason | W 1/2 | 32 | 21 N. | 6 W. | foraminifers |
| 0148 | Dry Bed Lakes 7.5-min. | Mason | SW SW | 32 | 21 N. | 6 W. | mollusks; Armentrout's Olympian Stage; sample UW B-405; Middle Fork Satsop River section; Armentrout's (1973) *Echinophoria apta* zone in the "Blakeley" molluscan stage is equivalent to the Juanian molluscan stage. |
| 0149 | Humptulips 7.5-min. | Grays Harbor | NE NE | 20 | 19 N. | 10 W. | foraminifers |
| 0150 | Railroad Camp 7.5-min. | Grays Harbor | SE NW | 29 | 20 N. | 9 W. | foraminifers |
| 0151 | Railroad Camp 7.5-min. | Grays Harbor | center N 1/2 | 26 | 20 N. | 9 W. | foraminifers |
| 0152 | Railroad Camp 7.5-min. | Grays Harbor | SE NW | 26 | 20 N. | 9 W. | foraminifers |
| 0153 | Railroad Camp 7.5-min. | Grays Harbor | SW | 26 | 20 N. | 9 W. | foraminifers |
| 0154 | Railroad Camp 7.5-min. | Grays Harbor | SE | 26 | 20 N. | 9 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0155 | S982 | 47°10'42" | 123°46'00" | Astoria(?) Formation | Miocene - early and middle | Saucesian | --- | Rau (1986) | |
| 0156 | F-8 (S-686) | 47°12'18" | 123°44'50" | Lincoln Creek Formation | Oligocene | Refugian - late to Zemorrian- early | --- | Rau (1967) | |
| 0157 | F-9, F-10, F-11 (S-688, S-689, S-692) | 47°11'50" | 123°44'50" | Lincoln Creek Formation | Oligocene | --- | --- | Rau (1967) | |
| 0158 | F-12 (S-691) | 47°11'30" | 123°44'59" | Astoria(?) Formation | Oligocene | Zemorrian - middle | --- | Rau (1967) | |
| 0159 | S981 | 47°11'25" | 123°45'05" | Astoria(?) Formation | Oligocene - Miocene | Zemorrian - Saucesian(?) | --- | Rau (1986) | |
| 0160 | F-2, F-3 (S-596, S-597) | 47°13'40" | 123°42'40" | Sedimentary rocks of late Eocene age | Eocene - middle | --- | --- | Rau (1967) | |
| 0161 | F-4 (S-673) | 47°13'35" | 123°41'35" | Lincoln Creek Formation | Eocene - late | Refugian | --- | Rau (1967) | |
| 0162 | F-6 (S-599) | 47°13'10" | 123°42'50" | Crescent Formation - sedimentary interbeds | Eocene - middle | --- | --- | Rau (1967) | |
| 0163 | F-5 (S-674) | 47°13'12" | 123°41'50" | Lincoln Creek Formation | Eocene - late | Refugian | --- | Rau (1967) | |
| 0164 | F-7 (S-658) | 47°12'45" | 123°40'45" | Astoria(?) Formation | Miocene | Saucesian (??) | --- | Rau (1967) | |
| 0165 | F-51 (S-528) | 47°12'59" | 123°37'35" | Sedimentary rocks of late Eocene age | Eocene - late | Narizian - late | --- | Rau (1967) | |
| 0166 | F-14 (S-600) | 47°11'50" | 123°43'00" | Crescent Formation - sedimentary interbeds | Eocene - middle | --- | --- | Rau (1967) | |
| 0167 | F-19 | 47°12'00" | 123°42'00" | Lincoln Creek Formation | Oligocene | Zemorrian - early? | --- | Rau (1967) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0155 | Railroad Camp 7.5-min. | Grays Harbor | SE NW | 35 | 20 N. | 9 W. | foraminifers |
| 0156 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NW | 24 | 20 N. | 9 W. | foraminifers |
| 0157 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE NW | 25 | 20 N. | 9 W. | foraminifers |
| 0158 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NW | 25 | 20 N. | 9 W. | foraminifers |
| 0159 | Railroad Camp 7.5-min. | Grays Harbor | SW NW | 25 | 20 N. | 9 W. | foraminifers |
| 0160 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SW SW | 8 | 20 N. | 8 W. | foraminifers. Unit is now called Humptulips Fm. (Rau, 1986). |
| 0161 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SW SW | 9 | 20 N. | 8 W. | foraminifers |
| 0162 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NE | 18 | 20 N. | 8 W. | foraminifers |
| 0163 | Wynoochee Valley NW 7.5-min. | Grays Harbor | center NE | 17 | 20 N. | 8 W. | foraminifers |
| 0164 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SW SE | 16 | 20 N. | 8 W. | foraminifers |
| 0165 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NW SW | 13 | 20 N. | 8 W. | foraminifers. Unit is now called Humptulips Fm. (Rau, 1986). |
| 0166 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE SE | 19 | 20 N. | 8 W. | foraminifers |
| 0167 | Wynoochee Valley NW 7.5-min. | Grays Harbor | W1/2 SE | 20 | 20 N. | 8 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0168 | F-13 (S-657) | 47°12'07" | 123°41'00" | Lincoln Creek Formation | Oligocene | Zemorrian? | --- | Rau (1967) | |
| 0169 | F-16 (S-601) | 47°11'20" | 123°43'05" | Astoria(?) Formation | Miocene | --- | --- | Rau (1967) | |
| 0170 | F-17 (S-602) | 47°11'21" | 123°43'15" | Lincoln Creek Formation | Eocene - late to Oligocene | Refugian | --- | Rau (1967) | |
| 0171 | F-20 (S-604) | 47°11'00" | 123°43'12" | Astoria(?) Formation | Miocene - early and middle | Saucesian | --- | Rau (1967) | |
| 0172 | F-24, F-23 (--, S-682) | 47°10'45" | 123°43'40" | Astoria(?) Formation | Miocene - early to middle | Saucesian - Relizian | --- | Rau (1967) | |
| 0173 | F-21, F-22 (S-677, S-681) | 47°10'42" | 123°43'15" | Astoria(?) Formation | Miocene - early to middle | Saucesian - Relizian | --- | Rau (1967) | |
| 0174 | F-27, F-28, F-29 (S-608, S-609, S-610) | 47°10'35" | 123°44'05" | Astoria(?) Formation | Miocene | --- | --- | Rau (1967) | |
| 0175 | F-30, -31, -32, -33 (S-636, -637, -638, -710) | 47°10'12" | 123°44'02" | Astoria(?) Formation | Miocene | --- | *Baggina* zone | Rau (1967) | |
| 0176 | R1499 | 47°09'15" | 123°44'15" | Astoria(?) Formation | Miocene - middle | --- | modified North Pacific diatom zone XXI | Barron (1981) | |
| 0177 | F-25 (S-695) | 47°10'25" | 123°42'58" | Astoria(?) Formation | Miocene | --- | --- | Rau (1967) | |
| 0178 | F-35 (S-641) | 47°09'40" | 123°44'58" | Montesano Formation | Miocene | Type Montesano | --- | Rau (1967) | |
| 0179 | R1502 | 47°09'40" | 123°45'05" | Montesano Formation | Miocene - late | --- | modified North Pacific diatom zone XV-XVIb | Barron (1981) | |
| 0180 | R1506 | 47°09'32" | 123°45'15" | Montesano Formation | Miocene - late | --- | modified North Pacific diatom zone XIII-XIV | Barron (1981) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0168 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NW SE | 21 | 20 N. | 8 W. | foraminifers |
| 0169 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NE | 30 | 20 N. | 8 W. | foraminifers; upper Astoria Formation |
| 0170 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SW NE | 30 | 20 N. | 8 W. | foraminifers |
| 0171 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE SW | 30 | 20 N. | 8 W. | foraminifers |
| 0172 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NW | 31 | 20 N. | 8 W. | foraminifers |
| 0173 | Wynoochee Valley NW 7.5-min. | Grays Harbor | center NE | 31 | 20 N. | 8 W. | foraminifers |
| 0174 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NE | 36 | 20 N. | 9 W. | foraminifers; Preachers Slough |
| 0175 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE | 36 | 20 N. | 9 W. | foraminifers |
| 0176 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE SE | 1 | 19 N. | 9 W. | diatoms; correlative with Relizian benthonic foraminiferal stage |
| 0177 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE SE | 31 | 20 N. | 8 W. | foraminifers; *Rotalia becki* |
| 0178 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NW | 1 | 19 N. | 9 W. | foraminifers |
| 0179 | Railroad Camp 7.5-min. | Grays Harbor | SW NW | 1 | 19 N. | 9 W. | diatoms; correlative with Mohnian benthonic foraminiferal stage |
| 0180 | Railroad Camp 7.5-min. | Grays Harbor | NE SE | 2 | 19 N. | 9 W. | diatoms; *Thalassiosira lineata* Jouse in sample |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0181 | R1504, 1505 | 47°09'30" | 123°45'05" | Montesano Formation | Miocene - late | --- | modified North Pacific diatom zone XV-XVIb | Barron (1981) | |
| 0182 | R1507, 1508 | 47°09'28" | 123°45'07" | Montesano Formation | Miocene - late | --- | modified North Pacific diatom zone XIII-XIV | Barron (1981) | |
| 0183 | R1509, 1510, 1511 | 47°09'30" | 123°45'15" | Montesano Formation | Miocene - late | --- | modified North Pacific diatom zone XIII?-XIV? | Barron (1981) | |
| 0184 | F-36, F-37 (S-705, S-643) | 47°09'20" | 123°44'58" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0185 | R1518 | 47°09'10" | 123°45'15" | Montesano Formation | Miocene - late | --- | modified North Pacific diatom zone XIII?-XIV? | Barron (1981) | |
| 0186 | F-38 (S-706) | 47°09'00" | 123°44'58" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0187 | F-15 (S-656) | 47°11'40" | 123°41'02" | Lincoln Creek Formation | Oligocene | Zemorrian (??) | --- | Rau (1967) | |
| 0188 | F-39, F-40 (S-649, S-650) | 47°10'45" | 123°40'50" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (1967) | |
| 0189 | F-41, F-43 (S-651, S-659) | 47°10'15" | 123°40'50" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0190 | F-42 | 47°10'20" | 123°39'35" | Astoria(?) Formation | Miocene | Saucesian? | --- | Rau (1967) | |
| 0191 | F-54 (S-531) | 47°11'02" | 123°37'15" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0192 | F-57 (S-534) | 47°10'30" | 123°37'25" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (1967) | |
| 0193 | F-44, F-45 (S-662, S-660) | 47°09'45" | 123°40'30" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0181 | Railroad Camp 7.5-min. | Grays Harbor | NW SW | 1 | 19 N. | 9 W. | diatoms |
| 0182 | Railroad Camp 7.5-min. | Grays Harbor | NW SW | 1 | 19 N. | 9 W. | diatoms; *Rhizosolenia miocenica* Schrader and *Coscinodiscus endoi* Kanaya in R1507; *Cosmiodiscus elegans* Greville in R1508 |
| 0183 | Railroad Camp 7.5-min. | Grays Harbor | NE SE | 2 | 19 N. | 9 W. | diatoms; correlative with Delmontian benthonic foraminiferal stage |
| 0184 | Wynoochee Valley NW 7.5-min. | Grays Harbor | E 1/2 SW | 1 | 19 N. | 9 W. | foraminifers |
| 0185 | Railroad Camp 7.5-min. | Grays Harbor | NW NW | 12 | 19 N. | 9 W. | diatoms; rare *Stephanopyxis schenckii* Kanaya; correlates with Delmontian benthonic foraminiferal stage |
| 0186 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE NW | 12 | 19 N. | 9 W. | foraminifers |
| 0187 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE NW | 28 | 20 N. | 8 W. | foraminifers |
| 0188 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE | 33 | 20 N. | 8 W. | foraminifers |
| 0189 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE | 33 | 20 N. | 8 W. | foraminifers |
| 0190 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NW SE | 34 | 20 N. | 8 W. | foraminifers |
| 0191 | Wynoochee Valley NE 7.5-min. | Grays Harbor | SE SW | 25 | 20 N. | 8 W. | foraminifers |
| 0192 | Wynoochee Valley NE 7.5-min. | Grays Harbor | N 1/2 SW | 36 | 20 N. | 8 W. | foraminifers |
| 0193 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NE | 4 | 19 N. | 8 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0194 | F-47 (S-671) | 47°09'30" | 123°40'55" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0195 | F-46 (S-672) | 47°09'48" | 123°41'12" | Astoria(?) Formation | Miocene | --- | --- | Rau (1967) | |
| 0196 | F-48 (S-669) | 47°08'30" | 123°41'55" | Montesano Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0197 | F-49 (S-670) | 47°08'07" | 123°42'50" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0198 | F-50 (S-693) | 47°08'20" | 123°43'10" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0199 | F-61 (S-537) | 47°09'55" | 123°43'05" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (1967) | |
| 0200 | F-65 (S-538) | 47°08'45" | 123°44'02" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0201 | F-66 (S-539) | 47°08'35" | 123°43'40 | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0202 | F-67 (S-541) | 47°08'00" | 123°44'00" | Astoria(?) Formation | Miocene | Saucesian - late | *Baggina* | Rau (1967) | |
| 0203 | F-68 (S-540) | 47°07'50" | 123°43'20" | Astoria(?) Formation | Miocene | Saucesian? | --- | Rau (1967) | |
| 0204 | F-70 (S-568 | 47°07'15" | 123°44'05" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0205 | F-71 (S-684) | 47°07'35" | 123°40'58" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (1967) | |
| 0206 | F-72 (S-685) | 47°07'00" | 123°41'10" | Astoria(?) Formation | Miocene - early | Saucesian - early | --- | Rau (1967) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0194 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NW SE | 4 | 19 N. | 8 W. | foraminifers |
| 0195 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE NW | 4 | 19 N. | 8 W. | foraminifers |
| 0196 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE SE | 8 | 19 N. | 8 W. | foraminifers |
| 0197 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NW NW | 17 | 19 N. | 8 W. | foraminifers |
| 0198 | Wynoochee Valley NW 7.5-min. | Grays Harbor | SE SE | 7 | 19 N. | 8 W. | foraminifers |
| 0199 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE NE | 2 | 19 N. | 8 W. | foraminifers |
| 0200 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NE SE | 10 | 19 N. | 8 W. | foraminifers |
| 0201 | Wynoochee Valley NW 7.5-min. | Grays Harbor | center SW | 11 | 19 N. | 8 W. | foraminifers |
| 0202 | Wynoochee Valley NW 7.5-min. | Grays Harbor | W 1/2 | 14 | 19 N. | 8 W. | foraminifers |
| 0203 | Wynoochee Valley NW 7.5-min. | Grays Harbor | NW SE | 14 | 19 N. | 8 W. | foraminifers |
| 0204 | Wynoochee Valley SW 7.5-min. | Grays Harbor | NE NE | 22 | 19 N. | 8 W. | foraminifers |
| 0205 | Wynoochee Valley NW 7.5-min. | Grays Harbor | W 1/2 SE | 16 | 19 N. | 8 W. | foraminifers |
| 0206 | Wynoochee Valley SW 7.5-min. | Grays Harbor | center | 21 | 19 N. | 8 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0207 | F-84 (S-702) | 47°06'25" | 123°43'15" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0208 | F-74 (S-399) | 47°06'45" | 123°40'25" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0209 | F-73 (S-542, -583) | 47°06'52" | 123°39'25" | Astoria(?) Formation | Miocene? | Zemorrian? - Saucesian? | --- | Rau (1967) | |
| 0210 | F-75 (S-696) | 47°06'15" | 123°40'02" | Astoria(?) Formation | Miocene | --- | | Rau (1967) | |
| 0211 | F-76, F-77 (S-582, S-581) | 47°06'00" | 123°39'45" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0212 | F-78 (S-557) | 47°05'50" | 123°38'30" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0213 | F-99 (S-577) | 47°09'25" | 123°30'02" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0214 | S1080 | 47°04'30" | 123°49'15" | Montesano Formation | Miocene - late | --- | --- | Rau (1986) | |
| 0215 | S1078 | 47°04'05" | 123°49'05" | Montesano Formation | Miocene - late | --- | --- | Rau (1986) | |
| 0216 | S1081 | 47°00'10" | 123°53'35" | Montesano Formation | Miocene - late | --- | --- | Rau (1986) | |
| 0217 | S1077 | 47°00'35" | 123°52'00" | Montesano Formation | Miocene - late | --- | --- | Rau (1986) | |
| 0218 | S1082 | 46°59'00" | 123°52'15" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (1986) | |
| 0219 | S1083 | 47°02'00" | 123°48'00" | Montesano Formation | Miocene - late | --- | --- | Rau (1986) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0207 | Wynoochee Valley SW 7.5-min. | Grays Harbor | NW NE | 30 | 19 N. | 8 W. | foraminifers |
| 0208 | Wynoochee Valley SW 7.5-min. | Grays Harbor | SE SE | 21 | 19 N. | 8 W. | foraminifers |
| 0209 | Wynoochee Valley SW 7.5-min. | Grays Harbor | N 1/2 SE | 22 | 19 N. | 8 W. | foraminifers |
| 0210 | Wynoochee Valley SW 7.5-min. | Grays Harbor | SE NW | 27 | 19 N. | 8 W. | foraminifers; abundant *Siphogenerina* |
| 0211 | Wynoochee Valley SW 7.5-min. | Grays Harbor | NW SE | 27 | 19 N. | 8 W. | foraminifers |
| 0212 | Wynoochee Valley SW 7.5-min. | Grays Harbor | center S 1/2 | 26 | 19 N. | 8 W. | foraminifers |
| 0213 | Wynoochee Valley NE 7.5-min. | Grays Harbor | SE SW | 1 | 19 N. | 7 W. | foraminifers |
| 0214 | Aberdeen Gardens 7.5-min. | Grays Harbor | SE NE | 5 | 18 N. | 9 W. | foraminifers. According to Rau and Armentrout (1983), Montesano Fm. is middle and late Miocene. |
| 0215 | Aberdeen Gardens 7.5-min. | Grays Harbor | SE SE | 5 | 18 N. | 9 W. | foraminifers. According to Rau and Armentrout (1983), Montesano Fm. is middle and late Miocene. |
| 0216 | New London 7.5-min. | Grays Harbor | NE SW | 35 | 18 N. | 10 W. | foraminifers. According to Rau and Armentrout (1983), Montesano Fm. is middle and late Miocene. |
| 0217 | Aberdeen Gardens 7.5-min. | Grays Harbor | NW NE | 36 | 18 N. | 10 W. | foraminifers. According to Rau and Armentrout (1983), Montesano Fm. is middle and late Miocene. |
| 0218 | Aberdeen 7.5-min. | Grays Harbor | SE SW | 1 | 17 N. | 10 W. | foraminifers |
| 0219 | Aberdeen Gardens 7.5-min. | Grays Harbor | SE NE | 21 | 18 N. | 9 W. | foraminifers. According to Rau and Armentrout (1983), Montesano Fm. is middle and late Miocene. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0220 | S1105 | 46°59'55" | 123°48'00" | Montesano Formation | Miocene - late | --- | --- | Rau (1986) | |
| 0221 | S1074 | 46°59'35" | 123°45'35" | Astoria(?) Formation | Miocene - early | Saucesian | --- | Rau (1986) | |
| 0222 | F-86 (S-570) | 47°04'30" | 123°42'10" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0223 | F-89 (S-572) | 47°03'07" | 123°41'30" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0224 | F-93 (S-574) | 47°00'15" | 123°40'45" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |
| 0225 | F-91 (S-585) | 47°00'30" | 123°38'40" | Astoria(?) Formation | Miocene | Saucesian - late | *Baggina* | Rau (1967) | |
| 0226 | F-90 (S-584) | 47°01'25" | 123°37'15" | Astoria(?) Formation | Miocene | --- | *Rotalia becki* | Rau (1967) | |
| 0227 | F-92 (S-586) | 47°00'02" | 123°37'00" | Astoria(?) Formation | Miocene | --- | --- | Rau (1967) | |
| 0228 | F-87 (S-523) | 47°04'35" | 123°37'35" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (1967) | |
| 0229 | A344 | 47°04'45" | 123°35'20" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0230 | A608 | 47°03'35" | 123°33'35" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0231 | 9066 | 47°03'20" | 123°33'30" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0232 | F-100 | 47°03'40" | 123°33'50" | Montesano Formation | Miocene | --- | --- | Rau (1967) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0220 | Aberdeen 7.5-min. | Grays Harbor | SE SE | 33 | 18 N. | 9 W. | foraminifers. According to Rau and Armentrout (1983), Montesano Fm. is middle and late Miocene. |
| 0221 | Aberdeen 7.5-min. | Grays Harbor | NE NE | 2 | 17 N. | 9 W. | foraminifers; well-preserved assemblage |
| 0222 | Wynoochee Valley SW 7.5-min. | Grays Harbor | center | 5 | 18 N. | 8 W. | foraminifers |
| 0223 | Wynoochee Valley SW 7.5-min. | Grays Harbor | NW NW | 16 | 18 N. | 8 W. | foraminifers |
| 0224 | Wynoochee Valley SW 7.5-min. | Grays Harbor | SE NE | 33 | 18 N. | 8 W. | foraminifers |
| 0225 | Wynoochee Valley SW 7.5-min. | Grays Harbor | NE NW | 35 | 18 N. | 8 W. | foraminifers |
| 0226 | Prices Peak 7.5-min. | Grays Harbor | NE NW | 25 | 18 N. | 8 W. | foraminifers |
| 0227 | Prices Peak 7.5-min. | Grays Harbor | NW SE | 36 | 18 N. | 8 W. | foraminifers |
| 0228 | Wynoochee Valley SW 7.5-min. | Grays Harbor | NW NW | 1 | 18 N. | 8 W. | foraminifers |
| 0229 | Prices Peak 7.5-min. | Grays Harbor | NW | 5 | 18 N. | 7 W. | mollusks |
| 0230 | Prices Peak 7.5-min. | Grays Harbor | center | 9 | 18 N. | 7 W. | mollusks |
| 0231 | Prices Peak 7.5-min. | Grays Harbor | SW SE | 9 | 18 N. | 7 W. | mollusks |
| 0232 | Prices Peak 7.5-min. | Grays Harbor | NE SW | 9 | 18 N. | 7 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0233 | A34? | 47°01'05" | 123°35'20" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0234 | A345 | 47°00'30" | 123°35'02" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0235 | 9070 | 47°00'30" | 123°35'30" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0236 | A610 | 46°59'48" | 123°35'40" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0237 | A347, 348, 349 | 47°01'15" | 123°31'20" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0238 | A350 | 47°00'20" | 123°31'20" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0239 | A353 | 47°04'10" | 123°28'40" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0240 | A352 | 47°04'25" | 123°27'45" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0241 | A355 | 47°03'55" | 123°26'15" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0242 | A354 | 47°00'45" | 123°25'55" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0243 | A356 | 47°03'10" | 123°20'15" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0244 | WDGER 9000 | 46°56'05" | 123°44'00" | Astoria(?) Formation | Miocene - middle | Saucesian - late | *Baggina washingtonensis* | Rau (WDGER unpub. data) | |
| 0245 | WDGER 1845 | 46°55'50" | 123°43'35" | Astoria(?) Formation | Miocene | --- | *Pseudoparrella parva* | Rau (WDGER unpub. data) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0233 | Prices Peak 7.5-min. | Grays Harbor | SW NW | 29 | 18 N. | 7 W. | mollusks |
| 0234 | Prices Peak 7.5-min. | Grays Harbor | NE NW | 32 | 18 N. | 7 W. | mollusks |
| 0235 | Prices Peak 7.5-min. | Grays Harbor | NW | 32 | 18 N. | 7 W. | mollusks |
| 0236 | Montesano 7.5-min. | Grays Harbor | NW NW | 5 | 17 N. | 7 W. | mollusks |
| 0237 | Prices Peak 7.5-min. | Grays Harbor | NW | 26 | 18 N. | 7 W. | mollusks |
| 0238 | Prices Peak 7.5-min. | Grays Harbor | NE NW | 35 | 18 N. | 7 W. | mollusks |
| 0239 | Elma 7.5-min. | Grays Harbor | NW NE | 7 | 18 N. | 6 W. | mollusks |
| 0240 | Elma 7.5-min. | Grays Harbor | NE SW | 5 | 18 N. | 6 W. | mollusks |
| 0241 | Elma 7.5-min. | Grays Harbor | NE NW | 9 | 18 N. | 6 W. | mollusks |
| 0242 | Elma 7.5-min. | Grays Harbor | SE SE | 28 | 18 N. | 6 W. | mollusks |
| 0243 | McCleary 7.5-min | Grays Harbor | NE NW | 17 | 18 N. | 5 W. | mollusks |
| 0244 | Central Park 7.5-min. | Grays Harbor | NW NW | 30 | 17 N. | 8 W. | foraminifers |
| 0245 | Central Park 7.5-min. | Grays Harbor | SW NE | 30 | 17 N. | 8 W. | foraminifers; (refer also to Gower and Pease, 1965) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0246 | WDGER 1596 | 46°56'12" | 123°45'40" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (WDGER unpub. data) | |
| 0247 | WDGER 1595 | 46°56'20" | 123°36'30" | Astoria(?) Formation | Miocene - early and early-middle | Saucesian | --- | Rau (WDGER unpub. data) | |
| 0248 | A411 | 46°56'40" | 123°35'15" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0249 | A342 | 46°55'55" | 123°34'00" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0250 | A343 | 46°56'00" | 123°33'05" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0251 | 9009, 9014, 9019 | 46°57'55" | 123°30'55" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0252 | A357 | 46°58'20" | 123°28'50" | Montesano Formation | Miocene | --- | --- | Etherington (1931) | |
| 0253 | A360 | 46°57'00" | 123°28'00" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0254 | 9008, 9015, 9020, 9023 | 46°56'40" | 123°31'10" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0255 | 9017, 9022, 9024 | 46°56'25" | 123°31'15" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0256 | A340 | 46°55'45" | 123°31'05" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0257 | 9025, 9026 | 46°55'15" | 123°30'45" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0258 | 9010 | 46°55'05" | 123°30'15" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0246 | Aberdeen 7.5-min. | Grays Harbor | NE NE | 28 | 17 N. | 8 W. | foraminifers; (refer to Gower and Pease, 1965) |
| 0247 | Montesano 7.5-min. | Grays Harbor | SW SW | 19 | 17 N. | 7 W. | foraminifers; typical Saucesian (see also Gower and Pease, 1965) |
| 0248 | Montesano 7.5-min. | Grays Harbor | NW SW | 20 | 17 N. | 7 W. | mollusks |
| 0249 | Montesano 7.5-min. | Grays Harbor | SE NW | 28 | 17 N. | 7 W. | mollusks |
| 0250 | Montesano 7.5-min. | Grays Harbor | SE NE | 28 | 17 N. | 7 W. | mollusks |
| 0251 | Montesano 7.5-min. | Grays Harbor | NE | 14 | 17 N. | 7 W. | mollusks |
| 0252 | South Elma 7.5-min. | Grays Harbor | NE SW | 7 | 17 N. | 6 W. | mollusks |
| 0253 | South Elma 7.5-min. | Grays Harbor | NW NW | 20 | 17 N. | 6 W. | mollusks |
| 0254 | Montesano 7.5-min. | Grays Harbor | NW SE | 23 | 17 N. | 7 W. | mollusks |
| 0255 | Montesano 7.5-min. | Grays Harbor | SE SW | 23 | 17 N. | 7 W. | mollusks |
| 0256 | Montesano 7.5-min. | Grays Harbor | NW SE | 26 | 17 N. | 7 W. | mollusks |
| 0257 | Montesano 7.5-min. | Grays Harbor | NE NE | 35 | 17 N. | 7 W. | mollusks |
| 0258 | Montesano 7.5-min. | Grays Harbor | SW NW | 36 | 17 N. | 7 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0259 | 9004, 9013 | 46°54'50" | 123°29'30" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0260 | 9003, 9005, 9012 | 46°54'10" | 123°28'30" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0261 | 8000 | 46°54'07" | 123°27'57" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0262 | A358 | 46°55'25" | 123°26'30" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0263 | A359 | 46°56'05" | 123°24'10" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0264 | 8002 | 46°53'45" | 123°27'15" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0265 | 8001 | 46°53'30" | 123°26'50" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0266 | A20, A377, A378, A414 | 46°52'45" | 123°26'30" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0267 | 9007 | 46°50'15" | 123°32'40" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0268 | A374 | 46°53'40" | 123°23'10" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0269 | A373, A375 | 46°53'30" | 123°21'15" | Astoria Formation | Miocene | --- | --- | Etherington (1931) | |
| 0270 | A371 | 46°51'45" | 123°21'15" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0271 | A372 | 46°52'00" | 123°21'00" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0259 | South Elma 7.5-min. | Grays Harbor | SE | 36 | 17 N. | 7 W. | mollusks |
| 0260 | South Elma 7.5-min. Malone 15-min. | Grays Harbor | E 1/2 | 6 | 16 N. | 6 W. | mollusks |
| 0261 | South Elma 7.5-min. | Grays Harbor | SE NW | 5 | 16 N. | 6 W. | mollusks |
| 0262 | South Elma 7.5-min. | Grays Harbor | NW NE | 33 | 17 N. | 6 W. | mollusks |
| 0263 | South Elma 7.5-min. | Grays Harbor | SE NW | 26 | 17 N. | 6 W. | mollusks |
| 0264 | South Elma 7.5-min. | Grays Harbor | SE SE | 5 | 16 N. | 6 W. | mollusks |
| 0265 | South Elma 7.5-min. | Grays Harbor | NW | 9 | 16 N. | 6 W. | mollusks |
| 0266 | South Elma 7.5-min. | Grays Harbor | N 1/2 | 16 | 16 N. | 6 W. | mollusks |
| 0267 | Brooklyn 7.5-min. | Grays Harbor | NE NE | 33 | 16 N. | 7 W. | mollusks |
| 0268 | South Elma 7.5-min. | Grays Harbor | NW NW | 12 | 16 N. | 6 W. | mollusks |
| 0269 | Malone 7.5-min. | Grays Harbor | center N 1/2 | 7 | 16 N. | 5 W. | mollusks |
| 0270 | Cedarville 7.5-min. | Grays Harbor | SW NE | 19 | 16 N. | 5 W. | mollusks |
| 0271 | Cedarville 7.5-min. | Grays Harbor | SE SE | 18 | 16 N. | 5 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0272 | A365 | 46°58'40" | 123°15'45" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0273 | A361, A364 | 46°58'10" | 123°16'40" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0274 | A0942, A0943, A0946 | 46°58'12" | 123°16'33" | Lincoln Creek Formation | Eocene - latest | Refugian - latest | --- | Mumby (1959) | |
| 0275 | 4209, 4210 | 46°57'55" | 123°16'30" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0276 | A1025, A1026 | 46°57'45" | 123°19'24" | Lincoln Creek Formation | Eocene - latest | Refugian - latest | --- | Mumby (1959) | |
| 0277 | 4211 | 46°57'25" | 123°19'30" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0278 | A1018 | 46°57'13" | 123°19'30" | Lincoln Creek Formation | Eocene - latest | Refugian - latest | --- | Mumby (1959) | |
| 0279 | A1009 | 46°56'58" | 123°19'15" | Lincoln Creek Formation | Eocene - latest | Refugian - latest | --- | Mumby (1959) | |
| 0280 | A410, A412, 4213 | 46°56'35" | 123°18'45" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0281 | A0980-A1005 | 46°56'31" | 123°18'49" | Lincoln Creek Formation | Eocene - latest | Refugian - latest | --- | Mumby (1959) | |
| 0282 | A363, A376 | 46°56'55" | 123°17'30" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0283 | A0969 | 46°56'50" | 123°17'34" | Lincoln Creek Formation | Eocene - latest | Refugian - latest | --- | Mumby (1959) | |
| 0284 | 4212 | 46°56'15" | 123°18'15" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0272 | Malone 7.5-min. | Grays Harbor | SE NE | 11 | 17 N. | 5 W. | mollusks |
| 0273 | Malone 7.5-min. | Grays Harbor | SW | 11 | 17 N. | 5 W. | mollusks |
| 0274 | Malone 7.5-min. | Grays Harbor | SE SW | 11 | 17 N. | 5 W. | foraminifers |
| 0275 | Malone 7.5-min. | Grays Harbor | NE NW | 14 | 17 N. | 5 W. | mollusks |
| 0276 | Malone 7.5-min. | Grays Harbor | SW NW | 16 | 17 N. | 5 W. | foraminifers |
| 0277 | Malone 7.5-min. | Grays Harbor | SW SW | 16 | 17 N. | 5 W. | mollusks |
| 0278 | Malone 7.5-min. | Grays Harbor | SW SW | 16 | 17 N. | 5 W. | foraminifers |
| 0279 | Malone 7.5-min. | Grays Harbor | NW | 21 | 17 N. | 5 W. | foraminifers |
| 0280 | Malone 7.5-min. | Grays Harbor | SE | 21 | 17 N. | 5 W. | mollusks |
| 0281 | Malone 7.5-min. | Grays Harbor | SE | 21 | 17 N. | 5 W. | foraminifers; latest Refugian, according to Armentrout (1981; as modified by Prothero and Armentrout, 1985) is correlative to early Oligocene. |
| 0282 | Malone 7.5-min. | Grays Harbor | N 1/2 | 22 | 17 N. | 5 W. | mollusks |
| 0283 | Malone 7.5-min. | Grays Harbor | SW NE | 22 | 17 N. | 5 W. | foraminifers |
| 0284 | Malone 7.5-min. | Grays Harbor | NE NE | 28 | 17 N. | 5 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0285 | A0962, A0966, A0971, A0972 | 46°55'13" | 123°18'07" | Lincoln Creek Formation | Eocene - latest | Refugian | --- | Mumby (1959) | |
| 0286 | --- | 46°54'45" | 123°18'05" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958; p. 53) | |
| 0287 | A0948-A0952 | 46°54'48" | 123°17'40" | Lincoln Creek Formation | Eocene - latest | Refugian - latest | --- | Mumby (1959) | |
| 0288 | A367 | 46°54'00" | 123°17'00" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0289 | A366 | 46°54'10" | 123°14'45" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0290 | F-4 (f11097) | 46°51'05" | 122°49'15" | McIntosh Formation | Eocene - late | --- | *Gyroidina-Uvigerina* | Snavely and others (1958) | |
| 0291 | F-5 (f11098) | 46°52'00" | 122°45'35" | McIntosh Formation | Eocene - middle | --- | *Amphimorphina californica* | Snavely and others (1958) | |
| 0292 | --- | 46°49'55" | 122°19'25" | equivalent to nonmarine sedimentary rocks in Centralia-Chehalis area | Pliocene - early | --- | --- | Snavely and others (1958, p. 66) | |
| 0293 | A368 | 46°50'55" | 123°14'58" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0294 | A11 | 46°51'25" | 123°14'00" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0295 | A380 | 46°48'20" | 123°17'55" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0296 | A21 | 46°49'20" | 123°17'45" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0297 | A370 | 46°49'30" | 123°17'00" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0285 | Malone 7.5-min. | Grays Harbor | W 1/2 NW | 34 | 17 N. | 5 W. | foraminifers |
| 0286 | Malone 7.5-min. | Grays Harbor | SW | 34 | 17 N. | 5 W. | megafossils |
| 0287 | Malone 7.5-min. | Grays Harbor | E 1/2 SW | 34 | 17 N. | 5 W. | foraminifers |
| 0288 | Malone 7.5-min. | Grays Harbor | NE SE | 3 | 16 N. | 5 W. | mollusks; see also Armentrout (1973) locality UW-367; Oakville section |
| 0289 | Capitol Peak 7.5-min. | Grays Harbor | NE SE | 1 | 16 N. | 5 W. | mollusks |
| 0290 | Bucoda 7.5-min. | Thurston | SE SE | 20 | 16 N. | 1 W. | foraminifers |
| 0291 | Bucoda 7.5-min. | Thurston | SE SE | 14 | 16 N. | 1 W. | foraminifers; equated to Laiming's (1940) B-1 and B-1A zones which are correlative to the Ulatisian (early to middle Eocene) according to Almgren and others (1988). *A. californica* Zone was renamed *Bulimina* cf. *B. jacksonensis* Zone (see Rau, 1981) |
| 0292 | Eatonville 7.5-min. | Thurston/Pierce | NE | 32 | 16 N. | 4 E. | fossil plants in siltstone |
| 0293 | Elbe 7.5-min. | Grays Harbor | NE | 25 | 16 N. | 5 W. | mollusks; see also Armentrout (1973) locality UW-161; Oakville section |
| 0294 | Elbe 7.5-min. | Grays Harbor | center S 1/2 | 19 | 16 N. | 4 W. | mollusks |
| 0295 | Cedarville 7.5-min. | Grays Harbor | NE NW | 10 | 15 N. | 5 W. | mollusks |
| 0296 | Cedarville 7.5-min. | Grays Harbor | NW NE | 3 | 15 N. | 5 W. | mollusks |
| 0297 | Cedarville 7.5-min. | Grays Harbor | SW SW | 35 | 16 N. | 5 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0298 | A379 | 46°49'00" (approx.) | 123°16'00" (approx.) | Cowlitz Formation | Eocene - late | --- | --- | Etherington (1931) | Pease and Hoover (1957) |
| 0299 | A369 | 46°49'30" | 123°15'30" | Cowlitz Formation | Eocene - late | --- | --- | Etherington (1931) | |
| 0300 | 7170 | 46°49'15" | 123°15'15" | Cowlitz Formation | Eocene - late | --- | --- | Etherington (1931) | |
| 0301 | 4214 | 46°49'10" | 123°15'10" | Cowlitz Formation | Eocene - late | --- | --- | Etherington (1931) | |
| 0302 | A382 | 46°47'45" | 123°15'45" | Cowlitz Formation | Eocene - late | --- | --- | Etherington (1931) | |
| 0303 | A383 | 46°49'05" | 123°14'15" | Cowlitz Formation | Eocene - late | --- | --- | Etherington (1931) | |
| 0304 | f11147 | 46°50'00" | 123°10'45" | McIntosh Formation | Eocene - middle | --- | *Vaginulinopsis vacavillensis* | Snavely and others (1958) | |
| 0305 | f11148 | 46°50'15" | 123°10'15" | McIntosh Formation | Eocene - middle | --- | *Vaginulinopsis vacavillensis* | Snavely and others (1958) | Pease and Hoover (1957) |
| 0306 | F-1 (f11094) | 46°50'25" | 123°09'45" | McIntosh Formation | Eocene - middle | --- | *Amphimorphina californica* | Snavely and others (1958) | |
| 0307 | A384, A385, A386, A18, A387 | 46°47'55" | 123°10'10" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0308 | A389 | 46°48'05" | 123°08'25" | Astoria Formation | Miocene - middle | --- | --- | Etherington (1931) | Snavely and others (1958; M-36) |
| 0309 | A17 | 46°48'00" | 123°07'00" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | Snavely and others (1958; M-29) |
| 0310 | F-11, F-12 (f11104, f11105) | 46°48'15" | 123°06'45" | Lincoln Creek Formation | Oligocene - late | --- | *Eponides mansfieldi oregonensis* | Snavely and others (1958) | Etherington (1931; A17) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0298 | Cedarville 7.5-min. | Grays Harbor | NE | 2 | 15 N. | 5 W. | mollusks. Pease and Hoover (1957) mapped these rocks as Skookumchuck Formation. |
| 0299 | Cedarville 7.5-min. | Grays Harbor | SW | 36 | 16 N. | 5 W. | mollusks |
| 0300 | Cedarville 7.5-min. | Grays Harbor | NE NW | 1 | 15 N. | 5 W. | mollusks |
| 0301 | Cedarville 7.5-min. | Grays Harbor | center N 1/2 | 1 | 15 N. | 5 W. | mollusks |
| 0302 | Cedarville 7.5-min. | Grays Harbor | SW | 12 | 15 N. | 5 W. | mollusks |
| 0303 | Oakville 7.5-min. | Grays Harbor | NW | 6 | 15 N. | 4 W. | mollusks |
| 0304 | Oakville 7.5-min. | Grays Harbor | NW | 34 | 16 N. | 4 W. | foraminifers; equivalent to Laiming's (1940) B-1 and B-1A zones which are correlative to the Ulatisian Stage (early and early-middle Eocene)(Almgren and others, 1988). |
| 0305 | Oakville 7.5-min. | Grays Harbor | SE | 27 | 16 N. | 4 W. | foraminifers; equivalent to Laiming's (1940) B-1 and B-1A zones which are correlative to the Ulatisian Stage (early and early-middle Eocene)(Almgren and others, 1988). |
| 0306 | Oakville 7.5-min. | Thurston | NW NW | 25 | 16 N. | 4 W. | foraminifers; equivalent to Laiming's (1940) B-1 and B-1A zone which are correlative to the Ulatisian Stage (early and early-middle Eocene)(Almgren and others, 1988). *A. californica* Zone was renamed *Bulimina* cf. *B. jacksonensis* Zone (see Rau, 1981). |
| 0307 | Oakville 7.5-min. | Grays Harbor | S 1/2 | 10 | 15 N. | 4 W. | mollusks |
| 0308 | Oakville 7.5-min. | Thurston | NE SE | 11 | 15 N. | 4 W. | mollusks |
| 0309 | Rochester 7.5-min. | Thurston | SW NW | 7 | 15 N. | 3 W. | mollusks |
| 0310 | Rochester 7.5-min. | Thurston | NW | 7 | 15 N. | 3 W. | foraminifers; offshore facies |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0311 | F-13 (f11106) | 46°47'40" | 123°06'30" | Lincoln Creek Formation | Oligocene - late | --- | *Eponides mansfieldi oregonensis* | Snavely and others (1958) | |
| 0312 | A408 | 46°48'00" | 123°05'55" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0313 | F-14 (f11107) | 46°47'45" | 123°05'00" | Lincoln Creek Formation | Oligocene - late | --- | *Eponides mansfieldi oregonensis* | Snavely and others (1958) | |
| 0314 | A392, A16 | 46°47'45" | 123°04'35" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0315 | A19 | 46°47'05" | 123°03'10" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0316 | A393 | 46°47'00" | 123°02'00" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0317 | --- | 46°44'30" | 123°19'40" | Crescent Formation | Eocene - late | --- | --- | Pease and Hoover (1957) | |
| 0318 | A381 | 46°44'58" | 123°16'55" | Cowlitz Formation | Eocene - late | --- | --- | Etherington (1931) | |
| 0319 | M-37 | 46°46'15" | 123°06'58" | Astoria(?) Formation | Miocene - middle | --- | --- | Snavely and others (1958) | |
| 0320 | A391 | 46°46'15" | 123°05'45" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0321 | M-30 (17389) | 46°45'20" | 123°06'00" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958) | |
| 0322 | F-8 (f11101) | 46°44'30" | 123°05'15" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0323 | A9 | 46°46'25" | 123°02'02" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0311 | Rochester 7.5-min. | Thurston | SE SW | 7 | 15 N. | 3 W. | foraminifers; offshore facies |
| 0312 | Rochester 7.5-min. | Thurston | NE SE | 7 | 15 N. | 3 W. | mollusks |
| 0313 | Rochester 7.5-min. | Thurston | SW SE | 8 | 15 N. | 3 W. | foraminifers; offshore facies |
| 0314 | Rochester 7.5-min. | Thurston | NE NE | 17 | 15 N. | 3 W. | mollusks |
| 0315 | Rochester 7.5-min. | Thurston | NE SE | 16 | 15 N. | 3 W. | mollusks |
| 0316 | Rochester 7.5-min. | Thurston | NE SE | 15 | 15 N. | 3 W. | mollusks |
| 0317 | Doty 7.5-min. | Lewis | NW SW | 33 | 15 N. | 5 W. | foraminifers; siltstone in interstices of pillow lavas |
| 0318 | Doty 7.5-min. | Lewis | NE NW | 35 | 15 N. | 5 W. | mollusks |
| 0319 | Rochester 7.5-min. | Thurston | NW SW | 19 | 15 N. | 3 W. | mollusks |
| 0320 | Rochester 7.5-min. | Thurston | SW SW | 20 | 15 N. | 3 W. | mollusks |
| 0321 | Rochester 7.5-min. | Lewis | NE SE | 30 | 15 N. | 3 W. | mollusks; offshore facies, tuffaceous siltstone member |
| 0322 | Adna 7.5-min. | Lewis | center | 32 | 15 N. | 3 W. | foraminifers. Skookumchuck Fm. is middle and late Eocene (Rau and others, 1983). |
| 0323 | Rochester 7.5-min. | Thurston | SE NE | 22 | 15 N. | 3 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0324 | F-17, -18, -19, -20 (f11110, 11111, 11112, 11113) | 46°46'12" | 123°02'02" | Lincoln Creek Formation | Eocene - late to Oligocene - early | --- | *Eponides kleinpelli* | Snavely and others (1958) | |
| 0325 | A325[?] | 46°45'50" | 123°01'58" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | Snavely and others (1958; F-22) |
| 0326 | F-22 (f11115) | 46°45'35" | 123°01'35" | Lincoln Creek Formation | Eocene - late to Oligocene - late | --- | *Eponides kleinpelli* | Snavely and others (1958) | Etherington (1931; A325[?]) |
| 0327 | F-23, -24, -25, -26, -27 (f11116, f11117, f11118, f11119, f11120); M-32 (18488) | 46°45'00" | 123°01'35" | Lincoln Creek Formation | Eocene - late to Oligocene - late | --- | *Eponides kleinpelli* | Snavely and others (1958) | |
| 0328 | A394 | 46°44'58" | 123°01'45" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0329 | A413 | 46°44'45" | 123°02'02" | Lincoln Creek Formation | Oligocene | --- | --- | Etherington (1931) | |
| 0330 | M-33 (18489) | 46°44'10" | 123°01'10" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958) | |
| 0331 | M-2 (17390) | 46°45'25" | 122°57'35" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0332 | M-34 (17400) | 46°44'15" | 122°58'20" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958) | |
| 0333 | M-22 (17401) | 46°43'15" | 122°56'50" | Lincoln Creek Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0334 | M-23 (17411, 17412) | 46°44'15" | 122°56'30" | Lincoln Creek Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0335 | M-3 (17396); F-9 (f11102) | 46°44'30" | 122°56'22" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1978) | Wiley (1979) |
| 0336 | M-4 (17410) | 46°45'50" | 122°55'48" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0324 | Rochester 7.5-min. | Thurston | E 1/2 SE | 22 | 15 N. | 3 W. | foraminifers; offshore facies; zone renamed *Cassidulina galvinensis* Zone by Rau (1966) and is considered to be late Eocene and early Oligocene (Rau, 1981). |
| 0325 | Rochester 7.5-min. | Lewis | NW NW | 26 | 15 N. | 3 W. | mollusks |
| 0326 | Rochester 7.5-min. | Lewis | SE NW | 26 | 15 N. | 3 W. | foraminifers; offshore facies; zone renamed *Cassidulina galvinensis* Zone by Rau (1966) and is considered to be late Eocene and early Oligocene (Rau, 1981). |
| 0327 | Adna 7.5-min. | Lewis | SE SW | 26 | 15 N. | 3 W. | foraminifers; offshore facies; zone renamed *Cassidulina galvinensis* Zone by Rau (1966) and is considered to be late Eocene and early Oligocene (Rau, 1981). |
| 0328 | Adna 7.5-min. | Lewis | NW NW | 35 | 15 N. | 3 W. | mollusks |
| 0329 | Adna 7.5-min. | Lewis | SE NE | 34 | 15 N. | 3 W. | mollusks |
| 0330 | Adna 7.5-min. | Lewis | NW NE | 2 | 14 N. | 3 W. | mollusks; offshore facies; tuffaceous siltstone member |
| 0331 | Violet Prairie 7.5-min. | Lewis | NE SW | 29 | 15 N. | 2 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0332 | Centralia 7.5-min. | Lewis | SE SE | 31 | 15 N. | 2 W. | mollusks; offshore facies, tuffaceous siltstone member |
| 0333 | Centralia 7.5-min. | Lewis | SW SW | 4 | 14 N. | 2 W. | mollusks; nearshore facies; basaltic sandstone member |
| 0334 | Centralia 7.5-min. | Lewis | SE SW | 33 | 15 N. | 2 W. | mollusks; nearshore facies, basaltic sandstone member |
| 0335 | Centralia 7.5-min. | Lewis | center | 33 | 15 N. | 2 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0336 | Violet Prairie 7.5-min. | Lewis | NE NE | 28 | 15 N. | 2 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0337 | M-5 (17391) | 46°47'40" | 122°52'05" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0338 | M-7 (18482) | 46°46'15" | 122°51'55" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0339 | M-10 (18483) | 46°46'30" | 122°49'55" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0340 | M-8, M-9 (17399, 17392) | 46°45'20" | 122°50'02" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0341 | M-11 (17404) | 46°46'35" | 122°49'02" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0342 | M-15 (17397) | 46°46'10" | 122°47'00" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0343 | M-14 (17408) | 46°45'40" | 122°47'00" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0344 | F-42 (f11136); M-26 (17395) | 46°47'02" | 122°44'45" | Lincoln Creek Formation | Eocene - late | --- | *Cibicides hodgei* | Snavely and others (1958) | |
| 0345 | M-6 (17964) | 46°43'45" | 122°51'45" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0346 | M-12 (17965) | 46°43'40" | 122°48'45" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0347 | USGS Paleobotany locality 9106 | 46°43'50" | 122°30'45" | McIntosh Formation | Eocene - middle and late | Ravenian - early | --- | Wolfe (1968) | Snavely and others (1958) |
| 0348 | WDGER 4169 | 46°44'30" | 123°46'25" | Crescent Formation | Eocene - middle | Ulatisian | --- | Rau (WDGER unpub. data) | |
| 0349 | WDGER 3854 | 46°43'10" | 123°45'50" | Crescent Formation | Eocene - middle | Ulatisian | --- | Rau (WDGER unpub. data) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0337 | Bucoda 7.5-min. | Thurston | NE NE | 13 | 15 N. | 2 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0338 | Bucoda 7.5-min. | Thurston | NW SW | 19 | 15 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0339 | Bucoda 7.5-min. | Thurston | SW NE | 20 | 15 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0340 | Bucoda 7.5-min. | Lewis | NE SW | 29 | 15 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0341 | Bucoda 7.5-min. | Thurston | center NW | 21 | 15 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0342 | Bucoda 7.5-min. | Thurston | NE SE | 22 | 15 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0343 | Bucoda 7.5-min. | Lewis | NE NE | 27 | 15 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0344 | Vail 7.5-min. | Thurston | NW SE | 13 | 15 N. | 1 W. | foraminifers; nearshore facies |
| 0345 | Logan Hill 7.5-min. | Lewis | SW NW | 6 | 14 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0346 | Logan Hill 7.5-min. | Lewis | SE NW | 4 | 14 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0347 | Bernier Creek 7.5-min. | Lewis | NE | 2 | 14 N. | 2 E. | well-preserved leaf prints; early Ravenian may be correlative with the "Transition" molluscan stage of Weaver and others (1944) which is equivalent to the Ulatisian benthonic foraminiferal stage (Addicott, 1981). |
| 0348 | South Bend 7.5-min. | Pacific | NW SW | 35 | 15 N. | 9 W. | foraminifers; siltstone interbed in Crescent basalt; Wagner (1967b). Ulatisian benthonic foraminiferal stage is equivalent to the early and middle Eocene (Armentrout, 1981). |
| 0349 | South Bend 7.5-min. | Pacific | NW NE | 11 | 14 N. | 9 W. | foraminifers; siltstone interbed in Crescent basalts; Wagner (1967b). Ulatisian benthonic foraminiferal stage is equivalent to the early and middle Eocene (Armentrout, 1981). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0350 | WDGER 3883 | 46°42'45" | 123°44'05" | Lincoln Creek Formation | Oligocene | Refugian | *Eponides kleinpelli* - lower or *Sigmomorphina schencki* - upper | Rau (WDGER unpub. data) | Rau (1958) |
| 0351 | WDGER 3772 | 46°42'58" | 123°44'30" | Lincoln Creek Formation | Oligocene | Zemorrian or Refugian | --- | Rau (WDGER unpub. data) | |
| 0352a | WDGER 3767 | 46°42'10" | 123°43'25" | Lincoln Creek Formation | Oligocene | Refugian - late | --- | Rau (WDGER unpub. data) | |
| 0352b | B1853 | 46°42'10" | 123°43'25" | Lincoln Creek Formation | Eocene - late | --- | Calcareous nannofossil zones NP 19,20,21,22 | Armentrout and Worsley (1980) | Prothero and Armentrout (1985) |
| 0353 | WDGER 3761 | 46°40'40" | 123°43'00" | Lincoln Creek Formation | Oligocene - late | Zemorrian | --- | Rau (WDGER unpub. data) | |
| 0354 | WDGER 3886 | 46°39'58" | 123°43'02" | Lincoln Creek Formation | Oligocene | Zemorrian - late | *Pseudoglandulina* aff. *P. inflata* - upper part of zone | Rau (WDGER data) | Rau (1958) |
| 0355a | WDGER 3771 | 46°40'10" | 123°42'10" | McIntosh Fm. - upper | Eocene - possibly late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0355b | B1844 | 46°40'10" | 123°42'10" | Cowlitz Fm. and equivalents | Eocene - late | --- | calcareous nannofossil zones NP 17-19 | Armentrout and Worsley (1980) | Prothero and Armentrout (1985) |
| 0356 | WDGER S-552 | 46°42'30" | 123°38'45" | Astoria(?) Fm. - middle | Miocene - middle | Relizian - possibly | --- | Rau (WDGER unpub. data) | |
| 0357 | WDGER 4166 | 46°41'45" | 123°37'45" | Astoria(?) Fm. - middle | Miocene - late-early to early-middle | Saucesian - late to Relizian - early | --- | Rau (WDGER unpub. data) | |
| 0358 | WDGER 3844 | 46°40'50" | 123°39'50" | Astoria(?) Fm. - lower | Miocene - early to middle | Saucesian - late to Relizian | --- | Rau (WDGER unpub. data) | |
| 0359 | WDGER 3765 | 46°40'58" | 123°38'00" | Astoria(?) Fm. - middle | Miocene - late early or early middle | Saucesian - late or Relizian - early | --- | Rau (WDGER unpub. data) | |
| 0360a | WDGER 3877 | 46°39'25" | 123°40'00" | Astoria(?) Fm. - lower | Miocene - early and early-middle | Saucesian | *Epistominella parva* | Rau (WDGER unpub. data) | Rau (1958) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0350 | Raymond 7.5-min. | Pacific | NE SE | 12 | 14 N. | 9 W. | foraminifers; Wagner (1967a) (*Eponides kleinpelli* Zone is now called *Cassidulina galvinensis* Zone; see Rau, 1981). Refugian benthonic foraminiferal stage is correlative to the late Eocene and early Oligocene (Armentrout, 1981; Prothero and Armentrout, 1985). |
| 0351 | Raymond 7.5-min. | Pacific | SW NE | 13 | 14 N. | 9 W. | foraminifers; Wagner (1967a) |
| 0352a | Raymond 7.5-min. | Pacific | SW NE | 18 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0352b | Raymond 7.5-min. | Pacific | SW NE | 18 | 14 N. | 8 W. | calcareous nannofossils (coccoliths) recovered from strata that yielded Refugian benthonic foraminifers |
| 0353 | Raymond 7.5-min. | Pacific | NE NE | 30 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0354 | Raymond 7.5-min. | Pacific | NE NE | 31 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0355a | Raymond 7.5-min. | Pacific | NE SE | 29 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0355b | Raymond 7.5-min. | Pacific | NE SE | 29 | 14 N. | 8 W. | calcareous nannofossils (coccoliths) recovered from strata that yielded benthonic foraminifers that are characteristic of the Narizian Stage (Rau, 1958) |
| 0356 | Raymond 7.5-min. | Pacific | NE NW | 14 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0357 | Raymond 7.5-min. | Pacific | SW SW | 13 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0358 | Raymond 7.5-min. | Pacific | SE SW | 22 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0359 | Raymond 7.5-min. | Pacific | SE SE | 23 | 14 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0360a | Raymond 7.5-min. | Pacific | near center of E. line | 42 | 14 N. | 8 W. | foraminifers; west of fault; Wagner (1967a); = center sec. 34; Rau (1967) reports that this broad zone can be subdivided into the *Siphogenerina kleinpelli, Baggina washingtonensis*, and *Rotalia becki* zones. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0360b | B1861 | 46°39'25" | 123°40'00" | Astoria(?) Fm. - lower | Miocene - early | --- | calcareous nannofossil zones NN 3-4 | Armentrout and Worsley (1980) | Prothero and Armentrout (1985) |
| 0361a | WDGER 3878 | 46°39'07" | 123°39'00" | Astoria(?) Fm. - lower | Miocene - early and early-middle | Saucesian | *Epistominella parva* | Rau (WDGER unpub. data) | Rau (1958) |
| 0361b | B1862 | 46°39'07" | 123°39'00" | Astoria(?) Fm. - lower | Miocene - early | --- | calcareous nannofossil zones NN 3-4 | Armentrout and Worsley (1980) | Prothero and Armentrout (1985) |
| 0362 | WDGER 3769 | 46°37'50" | 123°42'10" | McIntosh Formation | Eocene - middle | Ulatisian or possibly early Narizian | --- | Rau (WDGER unpub. data) | |
| 0363 | WR-8 | 46°37'25" | 123°38'20" | Astoria(?) Formation | Miocene - early and middle | --- | *Liracassis petrosa* | Armentrout (1973) | |
| 0364 | WR-6 | 46°36'55" | 123°38'00" | Lincoln Creek Formation | Oligocene - middle | Matlockian - early | *Echinophoria rex* | Armentrout (1973) | |
| 0365 | WR-5 | 46°36'28" | 123°38'35" | Lincoln Creek Formation | Oligocene - middle | Matlockian - early | *Echinophoria rex* | Armentrout (1973) | |
| 0366 | WR-4 | 46°36'00" | 123°37'50" | Lincoln Creek Formation | Oligocene - middle | Matlockian - early | *Echinophoria rex* | Armentrout (1973) | |
| 0367 | WR-3 | 46°36'00" | 123°38'00" | Lincoln Creek Formation | Oligocene - early | Galvinian - late | *Echinophoria fax* | Armentrout (1973) | |
| 0368a | WDGER 3770 | 46°34'45" | 123°38'10" | Lincoln Creek Formation | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0368b | B1845 | 46°34'45" (approx.) | 123°38'10" (approx.) | Cowlitz Fm. and equivalents | Eocene - late | --- | calcareous nannofossils zones NP 17-19 | Armentrout and Worsley (1980) | Prothero and Armentrout (1985) |
| 0369 | --- | 46°34'35" | 123°36'45" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958, p. 50) | Rau (1951, p. 423) |
| 0370 | WR-2 | 46°34'10" | 123°36'30" | Lincoln Creek Formation | Eocene - middle-late | Galvinian - early | *Bathybembix columbiana* | Armentrout (1973) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0360b | Raymond 7.5-min. | Pacific | near center of E. line | 42 | 14 N. | 8 W. | calcareous nannofossils (coccoliths) recovered from strata that yielded Saucesian benthonic foraminifers |
| 0361a | Raymond 7.5-min. | Pacific | near center of E. line | 43 | 14 N. | 8 W. | foraminifers; east of fault; Wagner (1967a); = SW sec. 35; Rau (1967) reports that this broad zone can be subdivided into the *Siphogenerina kleinpelli, Baggina washingtonensis*, and *Rotalia becki* zones. |
| 0361b | Raymond 7.5-min. | Pacific | near center of E. line | 43 | 14 N. | 8 W. | calcareous nannofossils (coccoliths) recovered from strata that yielded Saucesian benthonic foraminifers |
| 0362 | Raymond 7.5-min. | Pacific | SW NE | 8 | 13 N. | 8 W | foraminifers; Wagner (1967a) |
| 0363 | Menlo 7.5-min. | Pacific | SW SE | 11 | 13 N. | 8 W. | mollusks |
| 0364 | Menlo 7.5-min. | Pacific | SE NE | 14 | 13 N. | 8 W. | mollusks; Armentrout's Olympian Stage; sample UW B0995. Addicott (1981) correlates early Matlockian to early Oligocene. Armentrout's (1973) *Echinophoria rex* zone in the "Blakeley" molluscan stage is equivalent to the early Matlockian molluscan stage. |
| 0365 | Menlo 7.5-min. | Pacific | NE NW | 23 | 13 N. | 8 W. | mollusks; Armentrout's Olympian Stage; sample UW B0994. Addicott (1981) correlates early Matlockian to early Oligocene. Armentrout's (1973) *Echinophoria rex* zone in the "Blakeley" molluscan stage is equivalent to the early Matlockian molluscan stage. |
| 0366 | Menlo 7.5-min. | Pacific | SW NW | 24 | 13 N. | 8 W. | mollusks; Armentrout's Olympian Stage; sample UW B0993. Addicott (1981) correlates early Matlockian to early Oligocene. Armentrout's (1973) *Echinophoria rex* zone in the "Blakeley" molluscan stage is equivalent to the early Matlockian molluscan stage. |
| 0367 | Menlo 7.5-min. | Pacific | SE NE | 23 | 13 N. | 8 W. | mollusks; Armentrout's Chehalian Stage; sample UW B0992. Addicott (1981) correlates late Galvinian to late Eocene. Armentrout's (1973) *Echinophoria fax* zone in the "Blakeley" molluscan stage is equivalent to the late Galvinian molluscan stage. |
| 0368a | Menlo 7.5-min. | Pacific | SW SE | 26 | 13 N. | 8 W. | foraminifers; Wagner (1967a) |
| 0368b | Menlo 7.5-min. | Pacific | SW SE | 26 | 13 N. | 8 W. | calcareous nannofossils (coccoliths) recovered from strata that yielded Narizian benthonic foraminifers |
| 0369 | Menlo 7.5-min. | Pacific | NE | 36 | 13 N. | 8 W. | foraminifers; in bed of Willapa River |
| 0370 | Menlo 7.5-min. | Pacific | NW SW | 31 | 13 N. | 7 W. | mollusks; Armentrout's Chehalian Stage; sample UW A3449; UW A6447; UW B0991. Armentrout's (1973) *Bathybembix columbiana* zone in the "Lincoln" molluscan stage is equivalent to the early Galvinian molluscan stage. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0371 | WDGER 3764 | 46°32'12" | 123°40'30" | Crescent Formation | Eocene - middle; possibly early late | Ulatisian - late or Narizian - early | --- | Rau (WDGER unpub. data) | |
| 0372 | WDGER 4234 | 46°33'30" | 123°34'35" | McIntosh Fm. - upper | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0373 | WDGER 3872 | 46°33'12" | 123°34'15" | McIntosh Fm. - upper | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0374 | WDGER 3766 | 46°35'10" | 123°31'25" | Lincoln Creek Formation | Oligocene - late | Zemorrian - late | --- | Rau (WDGER unpub. data) | |
| 0375 | WDGER 3874 | 46°33'50" | 123°30'30" | Lincoln Creek Formation | Eocene - late | Refugian | *Sigmomorphina schencki* - possibly lower | Rau (WDGER unpub. data) | |
| 0376 | --- | 46°32'55" | 123°18'20" | Crescent Formation | Eocene - late | --- | --- | Pease and Hoover (1957) | |
| 0377 | A4499, A4500, A4524, A4501 | 46°32'55" | 123°18'20" | Crescent Formation | Eocene - late | Narizian - early | *Bulimina corrugata* | Strong (1967) | |
| 0378 | A4502 | 46°33'30" | 123°18'15" | McIntosh Fm. - lower | Eocene - middle to late | Narizian - early | --- | Strong (1967) | |
| 0379 | A4503 | 46°34'15" | 123°18'10" | McIntosh Fm. - lower | Eocene - middle to late | Narizian - early | --- | Strong (1967) | |
| 0380 | A4505 | 46°34'58" | 123°18'00" | McIntosh Fm. - upper | Eocene - middle to late | Narizian - early | --- | Strong (1967) | |
| 0381 | M-581 | 46°34'58" | 123°18'00" | Cowlitz Fm. - Stillwater Creek Member | Eocene - late | --- | A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0382 | A4504 | 46°35'10" | 123°18'00" | McIntosh Fm. - lower | Eocene - middle to late | Narizian - early | --- | Strong (1967) | |
| 0383 | M-582 | 46°35'10" | 123°18'00" | Cowlitz Fm. - Olequa Creek Member | Eocene - late | --- | A-1 zone of Laiming (1943) | Henriksen (1956) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0371 | Menlo 7.5-min. | Pacific | SE NW | 9 | 12 N. | 8 W. | foraminifers; siltstone interbed; Wagner (1967a) |
| 0372 | Lebam 7.5-min. | Pacific | center NW | 5 | 12 N. | 7 W. | foraminifers; Wagner (1967a). Rau and Armentrout (1983) correlate McIntosh Fm. to middle Eocene. |
| 0373 | Lebam 7.5-min. | Pacific | SW NE | 5 | 12 N. | 7 W. | foraminifers; Wagner (1967a). Rau and Armentrout (1983) correlate McIntosh Fm. to middle Eocene. |
| 0374 | Lebam 7.5-min. | Pacific | center W 1/2 SE | 26 | 13 N. | 7 W. | foraminifers; Wagner (1967a) |
| 0375 | Lebam 7.5-min. | Pacific | center north line | 2 | 12 N. | 7 W. | foraminifers; Wagner (1967a) |
| 0376 | Pe Ell 7.5-min. | Lewis | N 1/2 SE | 4 | 12 N. | 5 W. | foraminifers from argillite |
| 0377 | Pe Ell 7.5-min. | Lewis | N 1/2 SE | 4 | 12 N. | 5 W. | foraminifers from strata interbedded with basalt flows. Possibly equivalent to *Bulimina* cf. *B. jacksonensis* Zone of Rau (1981) which occurs in the Ulatisian benthonic foraminiferal stage which is equivalent to early and middle Eocene (Armentrout, 1981). |
| 0378 | Pe Ell 7.5-min. | Lewis | W 1/2 NE | 4 | 12 N. | 5 W. | foraminifers |
| 0379 | Pe Ell 7.5-min. | Lewis | SE NE | 33 | 13 N. | 5 W. | foraminifers |
| 0380 | Pe Ell 7.5-min. | Lewis | NW SW | 27 | 13 N. | 5 W. | foraminifers |
| 0381 | Pe Ell 7.5-min. | Lewis | NW SW | 27 | 13 N. | 5 W. | see also foraminifers by Strong (1967). According to Almgren and others (1988), Laiming's A-1 zone is equivalent to the Narizian benthonic foraminiferal stage which correlates to middle and late Eocene (Armentrout, 1981; Prothero and Armentrout, 1985). |
| 0382 | Pe Ell 7.5-min. | Lewis | SW NW | 27 | 13 N. | 5 W. | foraminifers |
| 0383 | Pe Ell 7.5-min. | Lewis | SW NW | 27 | 13 N. | 5 W. | see also foraminifers by Strong (1967). According to Almgren and others (1988), Laiming's A-1 zone is equivalent to the Narizian benthonic foraminiferal stage which correlates to middle and late Eocene (Armentrout, 1981; Prothero and Armentrout, 1985). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0384 | A4506, A4507, A4508 | 46°35'15" | 123°17'20" | Skookumchuck Fm. | Eocene - late | Narizian | --- | Strong (1967) | |
| 0385 | A4509 | 46°35'35" | 123°17'15" | Lincoln Creek Formation | Eocene - latest | Refugian | --- | Strong (1967) | |
| 0386 | A4510, A4511, A4512 | 46°36'00" | 123°16'30" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Strong (1967) | |
| 0387 | A4513 | 46°36'25" | 123°17'10" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Strong (1967) | |
| 0388 | A4514 | 46°36'40" | 123°16'50" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Strong (1967) | |
| 0389 | A4516 | 46°37'20" | 123°16'30" | Lincoln Creek Formation | Miocene - early | Saucesian - early | --- | Strong (1967) | |
| 0390 | --- | 46°39'40" | 123°14'45" | Nonmarine sedimentary rocks (unnamed) | Miocene - middle to late | --- | --- | Snavely and others (1958, p. 65) | Pease and Hoover (1957) |
| 0391 | M-27 (17402) | 46°40'00" | 123°09'25" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958) | |
| 0392 | P-1, P-1a | 46°39'48" | 123°08'25" | Non-marine sedimentary rocks (unnamed) | Miocene - middle to late | --- | --- | Snavely and others (1958, p. 65) | Pease and Hoover (1957) |
| 0393 | F-6 (f11099) | 46°42'00" | 123°07'00" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0394 | M-31 (18487) | 46°40'35" | 123°03'45" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958) | |
| 0395 | P-2 | 46°37'25" | 123°05'50" | Astoria(?) Formation | Miocene - middle | --- | --- | Snavely and others (1958) | |
| 0396 | M-1 (17403) | 46°34'35" | 123°07'10" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0384 | Pe Ell 7.5-min. | Lewis | NE | 27 | 13 N. | 5 W. | foraminifers. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0385 | Pe Ell 7.5-min. | Lewis | SE SE | 22 | 13 N. | 5 W. | foraminifers |
| 0386 | Pe Ell 7.5-min. | Lewis | NW | 23 | 13 N. | 5 W. | foraminifers |
| 0387 | Pe Ell 7.5-min. | Lewis | SE SE | 15 | 13 N. | 5 W. | foraminifers |
| 0388 | Pe Ell 7.5-min. | Lewis | NW SW | 14 | 13 N. | 5 W. | foraminifers |
| 0389 | Pe Ell 7.5-min. | Lewis | SE SW | 11 | 13 N. | 5 W. | foraminifers |
| 0390 | Rainbow Falls 7.5-min. | Lewis | NE | 36 | 14 N. | 5 W. | fossil plant material |
| 0391 | Rainbow Falls 7.5-min. | Lewis | SW SW | 26 | 14 N. | 4 W. | mollusks; offshore facies, tuffaceous siltstone member |
| 0392 | Rainbow Falls 7.5-min. | Lewis | NE NE | 35 | 14 N. | 4 W. | fossil wood |
| 0393 | Adna 7.5-min. | Lewis | SW NW | 18 | 14 N. | 3 W. | foraminifers. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0394 | Adna 7.5-min. | Lewis | NE NW | 28 | 14 N. | 3 W. | mollusks; offshore facies; tuffaceous siltstone member |
| 0395 | Curtis 7.5-min. | Lewis | SE SE | 7 | 13 N. | 3 W. | fossil logs up to 40 ft long; Bunker quarry |
| 0396 | Curtis 7.5-min. | Lewis | NE NE | 36 | 13 N. | 4 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0397 | M-577 | 46°33'30" | 123°08'25" | Cowlitz Fm. - Stillwater Creek Member | Eocene - late | --- | A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0398 | M-578 | 46°32'15" | 123°07'35" | Cowlitz Fm. - Olequa Creek Member | Eocene - late | --- | A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0399 | M-579 | 46°31'05" | 123°08'15" | Cowlitz Fm. - Stillwater Creek Member | Eocene - late | --- | probably older than A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0400 | M-574 | 46°31'15" | 123°11'40" | Crescent Fm. ("Metchosin" of Henriksen) | Eocene - late? | --- | older than A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0401 | M-19 (18485) | 46°42'30" | 122°57'00" | Lincoln Creek Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0402 | F-32 (f11125); M-20 (17405) | 46°42'28" | 122°56'55" | Lincoln Creek Formation | Eocene - late | --- | *Cibicides hodgei* | Snavely and others (1958) | |
| 0403 | F-34 (f11127) | 46°42'35" | 122°55'30" | Lincoln Creek Formation | Eocene - late | --- | *Cibicides hodgei* | Snavely and others (1958) | |
| 0404 | M-21 (17398) | 46°42'10" | 122°55'25" | Lincoln Creek Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0405 | M-18 (17394) | 46°39'55" | 122°57'40" | Lincoln Creek Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0406 | M-35 (18490) | 46°39'45" | 122°57'30" | Lincoln Creek Formation | Eocene - late to Oligocene | --- | --- | Snavely and others (1958) | |
| 0407 | F-37 (f11131) | 46°40'30" | 122°54'25" | Lincoln Creek Formation | Eocene - late | --- | *Cibicides hodgei* | Snavely and others (1958) | |
| 0408 | M-24 (17963) | 46°41'15" | 122°52'00" | Lincoln Creek Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0409 | F-38, F-39 (f11132, f11133) | 46°41'05" | 122°51'45" | Lincoln Creek Formation | Eocene - late | --- | *Cibicides hodgei* | Snavely and others (1958) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0397 | Boistfort 7.5-min. | Lewis | SW | 2 | 12 N. | 4 W. | foraminifers |
| 0398 | Boistfort 7.5-min. | Lewis | E 1/2 | 12 | 12 N. | 4 W. | foraminifers; traverse along South Fork of the Chehalis River |
| 0399 | Boistfort 7.5-min. | Lewis | SE SE | 14 | 12 N. | 4 W. | foraminifers. A-1 zone of Laiming (1943) is correlative to the Narizian benthonic foraminiferal stage (Almgren and others, 1988). |
| 0400 | Boistfort 7.5-min. | Lewis | N 1/2 SW | 16 | 12 N. | 4 W. | foraminifers; siltstone interbeds between basalt flows. A-1 zone of Laiming (1943) is correlative to the Narizian benthonic foraminiferal stage (Almgren and others, 1988). |
| 0401 | Centralia 7.5-min. | Lewis | SE SE | 8 | 14 N. | 2 W. | mollusks; nearshore facies; basaltic sandstone member |
| 0402 | Centralia 7.5-min. | Lewis | NW NW | 16 | 14 N. | 2 W. | foraminifers; nearshore facies. *Cibicides hodgei* zone is equivalent in part to the *Sigmomorphina schencki* zone (Refugian benthonic foraminiferal stage) although in places it extends higher in the section (Rau, 1981). |
| 0403 | Centralia 7.5-min. | Lewis | SW SW | 10 | 14 N. | 2 W. | foraminifers; nearshore facies. *Cibicides hodgei* zone is equivalent in part to the *Sigmomorphina schencki* zone (Refugian benthonic foraminiferal stage) although in places it extends higher in the section (Rau, 1981). |
| 0404 | Centralia 7.5-min. | Lewis | NW NW | 15 | 14 N. | 2 W. | mollusks; nearshore facies; basaltic sandstone member |
| 0405 | Centralia 7.5-min. | Lewis | SE SW | 29 | 14 N. | 2 W. | mollusks; nearshore facies; basaltic sandstone member |
| 0406 | Centralia 7.5-min. | Lewis | NW NE | 32 | 14 N. | 2 W. | mollusks; offshore facies; tuffaceous siltstone member |
| 0407 | Centralia 7.5-min. | Lewis | NW NW | 26 | 14 N. | 2 W. | foraminifers; nearshore facies. *Cibicides hodgei* zone is equivalent in part to the *Sigmomorphina schencki* zone (Refugian benthonic foraminiferal stage) although in places it extends higher in the section (Rau, 1981). |
| 0408 | Logan Hill 7.5-min. | Lewis | NE NE | 24 | 14 N. | 2 W. | mollusks; nearshore facies; basaltic sandstone member |
| 0409 | Logan Hill 7.5-min. | Lewis | W 1/2 | 19 | 14 N. | 1 W. | foraminifers; nearshore facies. *Cibicides hodgei* zone is equivalent in part to the *Sigmomorphina schencki* zone (Refugian benthonic foraminiferal stage) although in places it extends higher in the section (Rau, 1981). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0410 | F-40 (f11134) | 46°41'20" | 122°50'45" | Lincoln Creek Formation | Eocene - late | --- | *Cibicides hodgei* | Snavely and others (1958) | |
| 0411 | M-13 (18484) | 46°41'30" | 122°48'02" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0412 | M-25 (17961) | 46°40'45" | 122°46'45" | Lincoln Creek Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0413 | F-10 (f11103), M-16 (17960) | 46°40'45" | 122°46'00" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0414 | M-17 (17962) | 46°41'00" | 122°45'20" | Skookumchuck Formation | Eocene - late | --- | --- | Snavely and others (1958) | |
| 0415 | F-41 (f11135) | 46°40'02" | 122°46'02" | Lincoln Creek Formation | Eocene - late | --- | *Cibicides hodgei* | Snavely and others (1958) | |
| 0416 | P-3 | 46°39'30" | 122°46'30" | Astoria(?) Formation | Miocene | --- | --- | Snavely and others (1958) | |
| 0417 | WDGER 7816 | 46°24'15" | 123°49'10" | Sandstones of Megler | Eocene - middle | Ulatisian or Narizian | --- | Rau (WDGER unpub. data) | |
| 0418 | F-4 (3921) | 46°29'00" | 123°40'05" | Unit A (siltstone overlying Crescent Fm.) | Eocene - middle | Ulatisian-late or Narizian-early | --- | Wolfe and McKee (1972) | |
| 0419 | F-5 (4268) | 46°29'05" | 123°38'45" | Unit A (siltstone overlying Crescent Fm.) | Eocene - middle | Ulatisian-late or Narizian-early | --- | Wolfe and McKee (1972) | |
| 0420 | F-6 (S-431) | 46°28'30" | 123°36'50" | Unit B (volcanic rocks) | Eocene - late | Narizian | --- | Wolfe and McKee (1972) | |
| 0421 | WDGER 7821 | 46°24'10" | 123°57'99" | Lincoln Creek Fm. (basal sandstone) | Eocene -late(?) | Narizian or Refugian(?) | --- | Rau (WDGER unpub. data) | |
| 0422 | WDGER 7813 | 46°25'30" | 123°54'05" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (WDGER unpub. data) | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0423 | WDGER 8371 | 46°27'00" | 123°50'20" | Lincoln Creek Formation | Eocene - late or Oligocene | Refugian or Zemorrian | --- | Rau (WDGER unpub. data) | |
| 0424 | WDGER 7828 | 46°25'45" | 123°49'45" | Lincoln Creek Formation | Eocene - late or Oligocene | Refugian or Zemorrian | --- | Rau (WDGER unpub. data) | |
| 0425 | WDGER 8099 | 46°26'40" | 123°48'00" | Lincoln Creek Formation | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0426 | WDGER 8103 | 46°26'30" | 123°47'15" | Lincoln Creek Formation | Eocene - middle | Narizian - early | --- | Rau (WDGER unpub. data) | |
| 0427 | WDGER 8141 | 46°27'25" | 123°46'25" | Siltstones of Cliff Point | Eocene(?) | Narizian(?) | --- | Rau (WDGER unpub. data) | |
| 0428 | F-10 (WDGER 4020) | 46°26'10" | 123°44'05" | Unit B (tuffaceous siltstone) | Eocene - middle | Narizian - early | *Uvigerina* cf. *U. yazooensis* | Wolfe and McKee (1972) | |
| 0429 | WDGER 8348 | 46°23'44" | 123°49'25" | Astoria(?) Fm. - lower | Miocene - early | Saucesian | --- | Rau (WDGER unpub. data) | |
| 0430 | F-12 (4019) | 46°24'50" | 123°43'50" | Unit B (tuffaceous siltstone) | Eocene - middle? | Narizian - early? | --- | Wolfe and McKee (1972) | |
| 0431 | F-13 (4243) | 46°24'35" | 123°42'45" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian | --- | Wolfe and McKee (1972) | |
| 0432 | F-29 (4030) | 46°24'30" | 123°40'30" | Unit B (tuffaceous siltstone) | Eocene - late | Refugian | --- | Wolfe and McKee (1972 | |
| 0433 | F-30 (4027) | 46°24'30" | 123°40'30" | Unit B (tuffaceous siltstone) | Eocene - late or Oligocene | Refugian or Zemorrian | --- | Wolfe and McKee (1972) | |
| 0434 | F-11 (WDGER 4021) | 46°25'20" | 123°41'25" | Unit B (tuffaceous siltstone) | Eocene - middle | Narizian - early | *Bulimina jacksonensis* | Wolfe and McKee (1972); Rau (WDGER, unpub.) | |
| 0435 | F-9 (S-430) | 46°25'00" | 123°40'00" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian - late? | --- | Wolfe and McKee (1972) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0410 | Logan Hill 7.5-min. | Lewis | NE NE | 19 | 14 N. | 1 W. | foraminifers; nearshore facies. *Cibicides hodgei* zone is equivalent in part to the *Sigmomorphina schencki* zone (Refugian benthonic foraminiferal stage) although in places it extends higher in the section (Rau, 1981). |
| 0411 | Logan Hill 7.5-min. | Lewis | SE SE | 16 | 14 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0412 | Logan Hill 7.5-min. | Lewis | SE SE | 22 | 14 N. | 1 W. | mollusks; nearshore facies; basaltic sandstone member |
| 0413 | Logan Hill 7.5-min. | Lewis | SW SE | 23 | 14 N. | 1 W. | foraminifers. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0414 | Logan Hill 7.5-min. | Lewis | NW SW | 24 | 14 N. | 1 W. | mollusks. According to Rau and others (1983), Skookumchuck Fm. is middle and late Eocene. |
| 0415 | Logan Hill 7.5-min. | Lewis | NW SE | 26 | 14 N. | 1 W. | foraminifers; nearshore facies. *Cibicides hodgei* zone is equivalent in part to the *Sigmomorphina schencki* zone (Refugian benthonic foraminiferal stage) although in places it extends higher in the section (Rau, 1981). |
| 0416 | Logan Hill 7.5-min. | Lewis | SE NW | 35 | 14 N. | 1 W. | abundant well-preserved limbs and tree trunks |
| 0417 | Oman Ranch 7.5-min. | Pacific | NE SW | 29 | 12 N. | 9 W. | foraminifers; see also Wells (1989) |
| 0418 | Upper Naselle River 7.5-min. | Pacific | SW SE | 28 | 12 N. | 8 W. | foraminifers |
| 0419 | Upper Naselle River 7.5-min. | Pacific | SE SE | 27 | 12 N. | 8 W. | foraminifers |
| 0420 | Sweigiler Creek 7.5-min. | Pacific | NE SW | 36 | 12 N. | 8 W. | foraminifers |
| 0421 | Chinook 7.5-min. | Pacific | NW NW | 32 | 11 N. | 10 W. | foraminifers; Omeara Point; see also Wells (1989) |
| 0422 | Long Island 7.5-min. | Pacific | NE NW | 22 | 11 N. | 10 W. | foraminifers; see also Wells (1989) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0423 | Oman Ranch 7.5-min. | Pacific | NE SW | 7 | 11 N. | 9 W. | foraminifers; see also Wells (1989) |
| 0424 | Oman Ranch 7.5-min. | Pacific | SE SE | 18 | 11 N. | 9 W. | foraminifers; see also Wells (1989); water depths no less than upper bathyal (150 m). |
| 0425 | Oman Ranch 7.5-min. | Pacific | SE SW | 9 | 11 N. | 9 W. | foraminifers; see Wells (1989); most likely middle to upper bathyal water depths (150 to 2,000 m) |
| 0426 | Oman Ranch 7.5-min. | Pacific | NE NE | 16 | 11 N. | 9 W. | foraminifers; see also Wells (1989); most likely middle to upper bathyal water depths (150 to 2,000 m) |
| 0427 | Oman Ranch 7.5-min. | Pacific | NW NW | 11 | 11 N. | 9 W. | foraminifers; see also Wells (1989); probably bathyal water depths (> 150 m) |
| 0428 | Upper Naselle River 7.5-min. | Pacific | SE SE | 13 | 11 N. | 9 W. | foraminifers |
| 0429 | Oman Ranch 7.5-min. | Pacific | SE NW | 32 | 11 N. | 9 W. | foraminifers; see also Wells (1989); water depths no less than upper bathyal (water depths >150 m) |
| 0430 | Upper Naselle River 7.5-min. | Pacific | N 1/2 NE | 25 | 11 N. | 9 W. | foraminifers |
| 0431 | Upper Naselle River 7.5-min. | Pacific | SW NE | 30 | 11 N. | 8 W. | foraminifers |
| 0432 | Upper Naselle River 7.5-min. | Pacific | SE NW | 28 | 11 N. | 8 W. | foraminifers |
| 0433 | Upper Naselle River 7.5-min. | Pacific | SE NW | 28 | 11 N. | 8 W. | foraminifers |
| 0434 | Upper Naselle River 7.5-min. | Pacific | SW NE | 20 | 11 N. | 8 W. | foraminifers |
| 0435 | Upper Naselle River 7.5-min. | Pacific | SE | 21 | 11 N. | 8 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0436 | F-27 (S-435) | 46°24'25" | 123°38'50" | Unit B (tuffaceous siltstone) | Eocene - late | Refugian | --- | Wolfe and McKee (1972) | |
| 0437 | F-28 (3913) | 46°24'25" | 123°38'50" | Unit B (tuffaceous siltstone) | Eocene - late or Oligocene | Refugian or Zemorrian | --- | Wolfe and McKee (1972) | |
| 0438 | F-31 (S-410) | 46°23'50" | 123°36'30" | Lincoln Creek Formation (lower basaltic sandstone) | Eocene - late | Refugian? | *Sigmomorphina schencki* | Wolfe and McKee (1972) | |
| 0439 | M-3 (USGS Cenozoic locality M2506, M2564) | 46°23'50" | 123°36'30" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Molopophorus gabbi* | Wolfe and McKee (1972) | |
| 0440 | F-19 (S-438) | 46°23'45" | 123°35'30" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian or Refugian | --- | Wolfe and McKee (1972) | |
| 0441 | F-3 (4010) | 46°27'40" | 123°41'30" | Unit A (siltstone overlying Crescent Fm.) | Eocene - middle | Ulatisian-late or Narizian-early | --- | Wolfe and McKee (1972) | |
| 0442 | F-8 (4024) | 46°27'15" | 123°41'05" | Unit B (tuffaceous siltstone) | Eocene - middle | Narizian - early | *Bulimina* cf. *B. jacksonensis* | Wolfe and McKee (1972) | |
| 0443 | F-7 (S-428) | 46°27'25" | 123°38'15" | Unit B (volcanic rocks) | Eocene - late | Narizian | --- | Wolfe and McKee (1972) | |
| 0444 | F-18 (S-436) | 46°26'20" | 123°35'15" | Unit B (tuffaceous siltstone) | Eocene -late | Narizian | --- | Wolfe and McKee (1972) | |
| 0445 | F-17 (4195) | 46°24'55" | 123°35'55" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian | --- | Wolfe and McKee (1972) | |
| 0446 | F-21 (4192) | 46°24'15" | 123°33'15" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian | --- | Wolfe and McKee (1972) | |
| 0447 | M-1 (USGS Cenozoic locality M2562) | 46°24'15" | 123°33'15" | Unit B (basaltic or glauconitic sandstone) | Eocene - late | Cowlitz fauna | --- | Wolfe and McKee (1972) | |
| 0448 | F-2 (S-444) | 46°31'50" | 123°33'40" | sedimentary interbeds in Crescent Formation | Eocene - middle | Ulatisian | --- | Wolfe and McKee (1972) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0436 | Upper Naselle River 7.5-min. | Pacific | NE SE | 27 | 11 N. | 8 W. | foraminifers |
| 0437 | Upper Naselle River 7.5-min. | Pacific | NE SE | 27 | 11 N. | 8 W. | foraminifers |
| 0438 | Sweigiler Creek 7.5-min. | Pacific | NW NE | 36 | 11 N. | 8 W. | foraminifers |
| 0439 | Sweigiler Creek 7.5-min. | Pacific | NW NE | 36 | 11 N. | 8 W. | mollusks; "Lincoln" in Wolfe and McKee (1972) is equivalent to the late Galvinian molluscan stage of Armentrout (1981) |
| 0440 | Sweigiler Creek 7.5-min. | Pacific | SW NE | 31 | 11 N. | 7 W. | foraminifers |
| 0441 | Upper Naselle River 7.5-min. | Pacific | SW SE | 5 | 11 N. | 8 W. | foraminifers |
| 0442 | Upper Naselle River 7.5-min. | Pacific | NE NE | 8 | 11 N. | 8 W. | foraminifers |
| 0443 | Upper Naselle River 7.5-min. | Pacific | NW NW | 11 | 11 N. | 8 W. | foraminifers |
| 0444 | Sweigiler Creek 7.5-min. | Pacific | NE NE | 18 | 11 N. | 7 W. | foraminifers |
| 0445 | Sweigiler Creek 7.5-min. | Pacific | SW SW | 19 | 11 N. | 7 W. | foraminifers |
| 0446 | Sweigiler Creek 7.5-min. | Pacific | NE SW | 28 | 11 N. | 7 W. | foraminifers |
| 0447 | Sweigiler Creek 7.5-min. | Pacific | NE SW | 28 | 11 N. | 7 W. | mollusks (pelecypods and gastropods) |
| 0448 | Lebam 7.5-min. | Pacific | NW SW | 9 | 11 N. | 7 W. | foraminifers. Ulatisian benthonic foraminiferal stage is correlative to early and middle Eocene (Armentrout, 1981). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0449 | F-1 (S-433) | 46°31'30" | 123°32'00" | sedimentary interbeds in Crescent Formation | Eocene - middle | Ulatisian or Narizian | --- | Wolfe and McKee (1972) | |
| 0450 | WDGER 8649 | 46°27'35" | 123°27'55" | Crescent Formation | Eocene - middle | Ulatisian | *Vaginulinopsis vacavillensis* | Rau (WDGER unpub. data) | |
| 0451 | WDGER 8648 | 46°26'30" | 123°27'50" | McIntosh Fm. - lower | Eocene - middle | Ulatisian? | --- | Rau (WDGER unpub. data) | |
| 0452 | F-20 (3846) | 46°24'35" | 123°28'00" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian | --- | Wolfe and McKee (1972) | |
| 0453 | WDGER 8642 | 46°26'30" | 123°26'25" | McIntosh Fm. - lower | Eocene - late | Narizian | *Uvigerina yazooensis* | Rau (WDGER unpub. data) | |
| 0454 | WDGER 8640 | 46°26'30" | 123°24'27" | McIntosh Fm. - lower | Eocene - late | Narizian | *Bulimina schencki-Plectofrondicularia jenkinsi* or *Uvigerina yazooensis* | Rau (WDGER unpub. data) | |
| 0455 | WDGER 8641 | 46°23'25" | 123°19'25" | Cowlitz Formation | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0456 | WDGER 8872 | 46°27'05" | 123°18'00" | Crescent Formation | Eocene - middle | Ulatisian - late to Narizian - early | --- | Rau (WDGER unpub. data) | |
| 0457 | M-573 | 46°24'40" | 123°08'30" | Crescent Fm. ("Metchosin" of Henriksen) | Eocene - middle | --- | B-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0458 | M-576 | 46°26'25" | 123°05'15" | Cowlitz Fm. - Stillwater Creek Member | Eocene - late? | --- | probably older than A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0459 | M-575 | 46°25'30" | 123°05'30" | Crescent Fm. ("Metchosin" of Henriksen) | Eocene - late middle | --- | B-1A zone of Laiming (1943)? | Henriksen (1956) | |
| 0460 | M-583 | 46°27'10" | 122°57'35" | Cowlitz Fm. - Olequa Creek Member | Eocene - late | --- | A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0461 | M-584 | 46°23'55" | 122°57'50" | Cowlitz Fm. - Olequa Creek Member | Eocene - late | --- | A-1 zone of Laiming (1943) | Henriksen (1956) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0449 | Lebam 7.5-min. | Pacific | NW SE | 10 | 11 N. | 7 W. | foraminifers |
| 0450 | Blaney Creek 7.5-min. | Pacific | SE SE | 6 | 11 N. | 6 W. | foraminifers; see also Wells (1981). Ulatisian benthonic foraminiferal stage is correlative to early and middle Eocene (Armentrout, 1981). |
| 0451 | Blaney Creek 7.5-min. | Pacific | NE NE | 18 | 11 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0452 | Blaney Creek 7.5-min. | Pacific | SE NE | 30 | 11 N. | 6 W. | foraminifers |
| 0453 | Blaney Creek 7.5-min. | Pacific | NW NW | 16 | 11 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0454 | Blaney Creek 7.5-min. | Pacific | NW NE | 15 | 11 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0455 | Elochoman Pass 7.5-min. | Lewis | NW SE | 32 | 11 N. | 5 W. | foraminifers; see also Wells (1981) |
| 0456 | Elochoman Pass 7.5-min. | Lewis | SW NE | 9 | 11 N. | 5 W. | foraminifers; see Wells (1981) |
| 0457 | Boistfort Peak 7.5-min. | Lewis | center | 26 | 11 N. | 4 W. | foraminifers; siltstone interbed. Laiming's (1943) B-1 zone is correlative to the Penutian and Ulatisian benthonic foraminiferal stages (Almgren and others, 1988) which are equivalent to the early and middle Eocene (Armentrout, 1981). |
| 0458 | Wildwood 7.5-min. | Lewis | SE NW | 17 | 11 N. | 3 W. | foraminifers. Laiming's (1943) A-1 zone is correlative to the Narizian benthonic foraminiferal stage (Almgren and others, 1988) which is equivalent to the middle and late Eocene (Armentrout, 1981). |
| 0459 | Wildwood 7.5-min. | Lewis | SE NE | 19 | 11 N. | 3 W. | foraminifers. Laiming's (1943) B-1A zone is correlative to the Ulatisian benthonic foraminiferal stage (Almgren and others, 1988) which is equivalent to the early and middle Eocene (Armentrout, 1981). |
| 0460 | Winlock 7.5-min. | Lewis | center | 8 | 11 N. | 2 W. | foraminifers; shallow-water faunal facies; see also Armentrout (1973) locality UW-291, Olequa Creek section. Laiming's (1943) A-1 zone is correlative to the Narizian benthonic foraminiferal stage (Almgren and others, 1988). |
| 0461 | Winlock 7.5-min. | Lewis | center NW | 32 | 11 N. | 2 W. | foraminifers. Laiming's (1943) A-1 zone is correlative to the Narizian benthonic foraminiferal stage (Almgren and others, 1988) which is equivalent to the middle and late Eocene (Armentrout, 1981). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0462 | M-1 | 46°24'25" | 122°56'00" | Cowlitz Formation | Eocene - late | --- | --- | Roberts (1958) | |
| 0463 | M-2 | 46°23'52" | 122°56'02" | Cowlitz Formation | Eocene - late | --- | --- | Roberts (1958) | |
| 0464 | P-3 | 46°24'57" | 122°52'47" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0465 | M-5 | 46°25'10" | 122°52'40" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0466 | P-4 | 46°25'45" | 122°50'45" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0467 | P-7 | 46°27'02" | 122°48'10" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0468 | M-6 | 46°23'50" | 122°51'30" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0469 | P-10 | 46°24'40" | 122°43'55" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0470 | P-8 and P-9 | 46°24'20" | 122°44'15" | Wilkes Formation | Miocene | --- | --- | Roberts (1958) | |
| 0471 | Yellow Bluff | 46°18'45" | 124°01'35" | McIntosh Formation | Eocene - middle and late | --- | --- | Williams (1952) | |
| 0472 | WDGER 7826 | 46°22'45" | 123°54'00" | Lincoln Creek Formation | Miocene - early | Saucesian | --- | Rau (WDGER unpub. data) | |
| 0473 | WDGER 7817 | 46°18'17" | 123°54'15" | Crescent Formation(?) | Eocene - late | Refugian | --- | Rau (WDGER unpub. data) | |
| 0474 | WDGER 8140 | 46°18'30" | 123°52'45" | Sandstones of Megler | Eocene - middle to late | Narizian | --- | Rau (WDGER unpub. data) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0462 | Winlock 7.5-min. | Lewis | W 1/2 SE | 28 | 11 N. | 2 W. | mollusks; also Beck's (1943) collecting locality; see also Armentrout (1973) locality UW-1 Olequa Creek section |
| 0463 | Winlock 7.5-min. | Lewis | SE NE | 33 | 11 N. | 2 W. | mollusks |
| 0464 | Winlock 7.5-min. | Lewis | N 1/2 NW | 25 | 11 N. | 2 W. | flora |
| 0465 | Winlock 7.5-min. | Lewis | SE SW | 24 | 11 N. | 2 W. | mollusks; Gries Ranch beds |
| 0466 | Toledo 7.5-min. | Lewis | NE NW | 20 | 11 N. | 1 W. | flora |
| 0467 | Toledo 7.5-min. | Lewis | NE SE | 9 | 11 N. | 1 W. | flora |
| 0468 | Toledo 7.5-min. | Lewis | center NW | 31 | 11 N. | 1 W. | mollusks; recollected by May (1980) who assigned fossil assemblage to the "Unnamed Late Eocene Zonule" of the late Eocene Cowlitz Formation. |
| 0469 | Eden Valley 7.5-min. | Lewis | S 1/2 NW | 30 | 11 N. | 1 E. | flora |
| 0470 | Eden Valley 7.5-min. | Lewis | SW | 30 | 11 N. | 1 E. | flora |
| 0471 | Cape Disappointment 7.5-min. | Pacific | SE NW | 34 | 10 N. | 11 W. | foraminifers; mapped as Lincoln Creek Fm. by Walsh and others (1987) |
| 0472 | Long Island 7.5-min. | Pacific | NW SE | 3 | 10 N. | 10 W. | foraminifers; see also Wells (1979) |
| 0473 | Cape Disappointment 7.5-min | Pacific | NE SW | 34 | 10 N. | 10 W. | foraminifers; see also Wells (1979) |
| 0474 | Chinook 7.5-min. | Pacific | center | 35 | 10 N. | 10 W. | foraminifers; see also Wells (1979) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0475 | WDGER 8109 | 46°21'20" | 123°52'00" | Lincoln Creek Formation | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0476 | WDGER 8107 | 46°21'37" | 123°51'05" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (WDGER unpub. data) | |
| 0477 | WDGER 8106 | 46°21'45" | 123°50'30" | Astoria(?) Fm. - lower | Miocene - early | Saucesian | --- | Rau (WDGER unpub. data) | |
| 0478 | WDGER 7819 | 46°21'55" | 123°49'35" | Astoria(?) Fm. - lower | Miocene - early to middle | Saucesian | --- | Rau (WDGER unpub. data) | |
| 0479 | WDGER 8111 | 46°19'40" | 123°49'35" | Lincoln Creek Formation | Oligocene | Zemorrian | --- | Rau (WDGER unpub. data) | |
| 0480 | F-59 (4266) | 46°21'25" | 123°47'00" | Astoria Fm. (Unit III) | Miocene - early and middle | Saucesian or Relizian | --- | Wolfe and McKee (1972) | |
| 0481 | F-49 (4267) | 46°21'50" | 123°46'45" | Astoria Formation | Miocene - early and middle | Saucesian - late, Relizian, and Luisian - early | *Baggina washingtonensis* | Wolfe and McKee (1972) | |
| 0482 | F-50 (4208) | 46°21'30" | 123°45'55" | Astoria Formation | Miocene - early and middle | Saucesian or Relizian | --- | Wolfe and McKee (1972) | |
| 0483 | F-48 (4261) | 46°22'20" | 123°45'55" | Astoria Formation | Miocene - early and middle | Saucesian or Relizian | --- | Wolfe and McKee (1972) | |
| 0484 | WDGER 8138 | 46°22'22" | 123°45'35" | Astoria(?) Fm. - lower | Miocene - early | Saucesian | --- | Rau (WDGER unpub. data) | |
| 0485 | F-15 (4251) | 46°22'25" | 123°44'45" | Unit B (tuffaceous siltstone) | Eocene - late | Refugian | --- | Wolfe and McKee (1972) | |
| 0486 | F-16 (4011) | 46°22'15" | 123°44'05" | Unit B? | Eocene - late or Oligocene | Narizian or Refugian or Zemorrian | --- | Wolfe and McKee (1972) | |
| 0487 | WDGER 8104 | 46°23'07" | 123°45'05" | Sandstone at Megler | Eocene - middle | Ulatisian - late and Narizian - early | --- | Wells (1989) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0475 | Knappton 7.5-min. | Pacific | NW NW | 13 | 10 N. | 10 W. | foraminifers; see also Wells (1979) |
| 0476 | Knappton 7.5-min. | Pacific | SE SE | 12 | 10 N. | 10 W. | foraminifers; see also Wells (1979) |
| 0477 | Knappton 7.5-min. | Pacific | NE SE | 7 | 10 N. | 9 W. | foraminifers; see also Wells (1979) |
| 0478 | Knappton 7.5-min. | Pacific | SW NW | 8 | 10 N. | 9 W. | foraminifers; see also Wells (1979) |
| 0479 | Knappton 7.5-min. | Pacific | NE NE | 30 | 10 N. | 9 W. | foraminifers; see also Wells (1979) |
| 0480 | Knappton 7.5-min. | Pacific | NW NW | 15 | 10 N. | 9 W. | foraminifers; water depths 50 to 300 ft. |
| 0481 | Knappton 7.5-min. | Pacific | NE SW | 10 | 10 N. | 9 W. | foraminifers; |
| 0482 | Knappton 7.5-min. | Pacific | SW SW | 11 | 10 N. | 9 W. | foraminifers |
| 0483 | Knappton 7.5-min. | Pacific | NW NW | 11 | 10 N. | 9 W. | foraminifers |
| 0484 | Knappton 7.5-min. | Pacific | SE SW | 2 | 10 N. | 9 W. | foraminifers; see also Wells (1989). According to Armentrout (1981), the Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene. |
| 0485 | Rosburg 7.5-min. | Wahkiakum | SW SW | 1 | 10 N. | 9 W. | foraminifers |
| 0486 | Rosburg 7.5-min. | Wahkiakum | NW NE | 12 | 10 N. | 9 W. | foraminifers |
| 0487 | Oman Ranch 7.5-min. | Pacific | NE NE | 2 | 10 N. | 9 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0488 | F-14 (4014) | 46°22'55" | 123°43'10" | Unit B (tuffaceous siltstone) | Eocene - late | Refugian | --- | Wolfe and McKee (1972) | |
| 0489 | F-51 (3914A) | 46°21'35" | 123°43'25" | Astoria Fm. (Unit I) | Miocene - early | Saucesian | --- | Wolfe and McKee (1972) | |
| 0490 | M-22 (USGS Cenozoic locality M2780) | 46°21'35" | 123°43'25" | Astoria Formation | Miocene - middle | Temblor | --- | Wolfe and McKee (1972) | |
| 0491 | F-60 (4265) | 46°20'40" | 123°45'02" | Astoria Formation | Miocene - early and middle | Saucesian - late, Relizian, and Luisian - early | *Baggina washingtonensis* | Wolfe and McKee (1972) | |
| 0492 | M-23 (USGS Cenozoic locality M2509) | 46°21'00" | 123°43'30" | Astoria Fm. (Unit I) | Miocene - middle | Temblor (Pillarian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0493 | F-52 (3915) | 46°20'15" | 123°38'30" | Astoria Fm. (Unit I) | Miocene - early | Saucesian | --- | Wolfe and McKee (1972) | |
| 0494 | M-26 (USGS Cenozoic locality M2781) | 46°22'20" | 123°37'15" | Astoria Fm. (Unit I) | Miocene - middle | Temblor (Pillarian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0495 | M-27 (USGS Cenozoic locality M2548) | 46°22'20" | 123°36'30" | Astoria Fm. (Unit II) | Miocene - middle | Temblor (Newportian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0496 | F-53 (4349) | 46°22'15" | 123°36'15" | Astoria Fm. (Unit II) | Miocene - early | Saucesian | --- | Wolfe and McKee (1972) | |
| 0497 | F-32 (S-408) | 46°22'20" | 123°35'15" | Lincoln Creek Fm. (lower basaltic sandstone) | Eocene - late | Refugian | *Sigmomorphina schencki* | Wolfe and McKee (1972) | |
| 0498 | F-24 (S-412) | 46°22'25" | 123°33'10" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian or Refugian | --- | Wolfe and McKee (1972) | |
| 0499 | F-26 (S-411) | 46°22'50" | 123°33'25" | Unit B (tuffaceous siltstone) | Eocene - late | Refugian | --- | Wolfe and McKee (1972) | |
| 0500 | F-23 (S-417) | 46°22'52" | 123°32'52" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian | *Bulimina schencki* | Wolfe and McKee (1972) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0488 | Upper Naselle River 7.5-min. | Wahkiakum | NW | 6 | 11 N. | 8 W. | foraminifers |
| 0489 | Rosburg 7.5-min. | Wahkiakum | SW SW | 7 | 10 N. | 8 W. | foraminifers; relatively deep-water offshore facies. According to Armentrout (1981), the Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene. |
| 0490 | Rosburg 7.5-min. | Wahkiakum | SW SW | 7 | 10 N. | 8 W. | mollusks |
| 0491 | Knappton 7.5-min. | Pacific | SE SE | 14 | 10 N. | 9 W. | foraminifers |
| 0492 | Rosburg 7.5-min. | Wahkiakum | NW SW | 18 | 10 N. | 8 W. | mollusks; locality mislabeled M-33 west of Deep River on Fig. 4; Pillarian molluscan stage is correlative to early Miocene (Addicott, 1981). |
| 0493 | Rosburg 7.5-min. | Wahkiakum | SW NW | 23 | 10 N. | 8 W. | foraminifers; relatively deep-water offshore facies. According to Armentrout (1981), the Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene. |
| 0494 | Grays River 7.5-min. | Wahkiakum | SE SE | 2 | 10 N. | 8 W. | mollusks; relatively deep-water offshore facies. Pillarian molluscan stage is correlative to early Miocene (Addicott, 1981). |
| 0495 | Grays River 7.5-min. | Wahkiakum | NW NE | 12 | 10 N. | 8 W. | mollusks; nearshore shallow-water facies |
| 0496 | Grays River 7.5-min. | Wahkiakum | NE NE | 12 | 10 N. | 8 W. | foraminifers; nearshore shallow-water facies. Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). |
| 0497 | Grays River 7.5-min | Wahkiakum | SW SE | 6 | 10 N. | 7 W. | foraminifers |
| 0498 | Grays River 7.5-min. | Wahkiakum | SE SW | 4 | 10 N. | 7 W. | foraminifers |
| 0499 | Sweigiler Creek 7.5-min. | Wahkiakum | center NW | 4 | 10 N. | 7 W. | foraminifers |
| 0500 | Sweigiler Creek 7.5-min. | Wahkiakum | NE NE | 4 | 10 N. | 7 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0501 | F-22 (4256) | 46°22'30" | 123°32'10" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian or Refugian? | --- | Wolfe and McKee (1972) | |
| 0502 | F-25 (S-413) | 46°22'25" | 123°32'25" | Unit B (tuffaceous siltstone) | Eocene - late | Narizian or Refugian | *Plectofrondicularia* cf. *P. jenkinsi* | Wolfe and McKee (1972) | |
| 0503 | M-9 (USGS Cenozoic locality M2561) | 46°21'45" | 123°32'15" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Turritella porterensis* | Wolfe and McKee (1972) | |
| 0504 | M-5 (USGS Cenozoic locality M2507) | 46°21'45" | 123°31'30" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Molopophorus gabbi* | Wolfe and McKee (1972) | |
| 0505 | M-6 (USGS Cenozoic locality M2508) | 46°21'40" | 123°31'05" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Molopophorus gabbi* | Wolfe and McKee (1972) | |
| 0506 | F-33 (4185) | 46°21'40" | 123°30'40" | Lincoln Creek Fm. (lower basaltic sandstone) | Eocene - late | Refugian | *Cassidulina galvinensis* | Wolfe and McKee (1972) | |
| 0507 | M-10 (USGS Cenozoic locality M2501) | 46°21'20" | 123°32'50" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Turritella porterensis* | Wolfe and McKee (1972) | |
| 0508 | F-35 (S-407) | 46°21'20" | 123°32'50" | Lincoln Creek Fm. (lower basaltic sandstone) | Oligocene - early | Refugian or Zemorrian | *Cassidulina galvinensis* | Wolfe and McKee (1972) | |
| 0509 | M-11 (USGS Cenozoic locality M2500) | 46°21'10" | 123°32'20" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Turritella porterensis* | Wolfe and McKee (1972) | |
| 0510 | M-12 (USGS Cenozoic locality M2505) | 46°21'00" | 123°32'10" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Turritella porterensis* | Wolfe and McKee (1972) | |
| 0511 | F-36 (4187) | 46°20'40" | 123°31'40" | Lincoln Creek Fm. (lower basaltic sandstone) | Eocene - late | Refugian | *Sigmomorphina schencki* | Wolfe and McKee (1972); Rau (WDGER, unpub.) | |
| 0512 | M-13 (USGS Cenozoic locality M2565) | 46°20'40" | 123°31'40" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Turritella porterensis* | Wolfe and McKee (1972) | |
| 0513 | M-14 (USGS Cenozoic locality M2504) | 46°20'40" | 123°31'40" | Lincoln Creek Formation | Oligocene | "Lincoln" | *Turritella porterensis* | Wolfe and McKee (1972) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0501 | Border between Grays River 7.5-min and Sweigiler Creek 7.5-min. | Wahkiakum | center SW | 3 | 10 N. | 7 W. | foraminifers |
| 0502 | Grays River 7.5-min. | Wahkiakum | SW SW | 3 | 10 N. | 7 W. | foraminifers |
| 0503 | Grays River 7.5-min. | Wahkiakum | NW SW | 10 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0504 | Grays River 7.5-min. | Wahkiakum | NE SE | 10 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0505 | Grays River 7.5-min. | Wahkiakum | NW SW | 11 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0506 | Grays River 7.5-min. | Wahkiakum | center S 1/2 | 11 | 10 N. | 7 W. | foraminifers |
| 0507 | Grays River 7.5-min. | Wahkiakum | NW NE | 16 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985) |
| 0508 | Grays River 7.5-min. | Wahkiakum | NW NE | 16 | 10 N. | 7 W. | foraminifers |
| 0509 | Grays River 7.5-min. | Wahkiakum | SW NW | 15 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985). |
| 0510 | Grays River 7.5-min. | Wahkiakum | NE SW | 15 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985). |
| 0511 | Grays River 7.5-min. | Wahkiakum | S1/2 SE | 15 | 10 N. | 7 W. | foraminifers |
| 0512 | Grays River 7.5-min. | Wahkiakum | S 1/2 SE | 15 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985). |
| 0513 | Grays River 7.5-min. | Wahkiakum | S 1/2 SE | 15 | 10 N. | 7 W. | mollusks; "Lincoln" stage in Wolfe and McKee (1972) is equivalent to late Galvinian molluscan stage in Armentrout (1981) which is correlative to the Oligocene (Armentrout, 1981, as modified by Prothero and Armentrout, 1985). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0514 | F-37 (3901) | 46°20'15" | 123°32'40" | Lincoln Creek Formation | Eocene - late or Oligocene | Refugian or Zemorrian | — | Wolfe and McKee (1972) | |
| 0515 | F-38 (3899) | 46°19'45" | 123°31'20" | Lincoln Creek Formation | Eocene - late or Oligocene | Refugian or Zemorrian | --- | Wolfe and McKee (1972) | |
| 0516 | F-44 (4206) | 46°19'40" | 123°36'35" | Lincoln Creek Formation | Oligocene | Zemorrian | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0517 | F-45 (3904) | 46°19'30" | 123°36'02" | Lincoln Creek Formation | Oligocene | Zemorrian | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0518 | M-16 (USGS Cenozoic locality M2502) | 46°19'30" | 123°36'02" | Lincoln Creek Formation | Oligocene | "Blakeley" | *Echinophoria rex* | Wolfe and McKee (1972) | |
| 0519 | F-46 (4203) | 46°18'40" | 123°36'25" | Lincoln Creek Formation | Oligocene | Refugian or Zemorrian? | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0520 | M-17 (USGS Cenozoic locality M2503) | 46°19'10" | 123°35'50" | Lincoln Creek Formation | Oligocene | "Blakeley" | *Echinophoria rex* | Wolfe and McKee (1972) | |
| 0521 | M-18 (USGS Cenozoic locality M2786) | 46°18'55" | 123°35'15" | Lincoln Creek Formation | Oligocene | Juanian | *Echinophoria apta* | Wolfe and McKee (1972) | |
| 0522 | F-39 (3897) | 46°19'20" | 123°33'25" | Lincoln Creek Formation | Oligocene | Zemorrian | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0523 | F-40 (3903) | 46°18'40" | 123°33'28" | Lincoln Creek Formation | Oligocene | Zemorrian | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0524 | WDGER 8647 | 46°20'00" | 123°27'45" | Lincoln Creek Fm. (basal sandstone) | Eocene - late | Refugian | *Sigmomorphina schencki* | Rau (WDGER unpub. data) | |
| 0525 | WDGER 8646 | 46°19'55" | 123°27'25" | Siltstone of Skamokawa Creek | Eocene - late | Narizian or Refugian | --- | Rau (WDGER unpub. data) | |
| 0526 | WDGER 8626 | 46°19'25" | 123°26'17" | Siltstone of Skamokawa Creek | Eocene - late | Narizian | *Uvigerina yazooensis* or *Bulimina schencki-Plectofrondicularia jenkinsi* | Rau (WDGER unpub. data) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0514 | Grays River 7.5-min. | Wahkiakum | SE NE | 21 | 10 N. | 7 W. | foraminifers |
| 0515 | Grays River 7.5-min. | Wahkiakum | SE SE | 22 | 10 N. | 7 W. | foraminifers |
| 0516 | Grays River 7.5-min. | Wahkiakum | NW NE | 25 | 10 N. | 8 W. | foraminifers |
| 0517 | Grays River 7.5-min. | Wahkiakum | SW NW | 30 | 10 N. | 7 W. | foraminifers |
| 0518 | Grays River 7.5-min. | Wahkiakum | SW NW | 30 | 10 N. | 7 W. | mollusks; "Blakeley" stage in Wolfe and McKee (1972)(*Echinophoria rex* zone) is equivalent to early Matlockian molluscan stage of Armentrout (1981) |
| 0519 | Grays River 7.5-min. | Wahkiakum | NE NE | 36 | 10 N. | 8 W. | foraminifers |
| 0520 | Grays River 7.5-min. | Wahkiakum | SW | 30 | 10 N. | 7 W. | mollusks; "Blakeley" stage in Wolfe and McKee (1972)(*Echinophoria rex* zone) is equivalent to early Matlockian molluscan stage of Armentrout (1981) |
| 0521 | Grays River 7.5-min. | Wahkiakum | SW SE | 30 | 10 N. | 7 W. | mollusks; upper "Blakeley" stage in Wolfe and McKee (1972)(*Echinophoria apta* zone) is equivalent to Juanian molluscan stage of Armentrout (1981) which is correlative to the late Oligocene (Armentrout, 1981). |
| 0522 | Grays River 7.5-min. | Wahkiakum | SW NW | 28 | 10 N. | 7 W. | foraminifers |
| 0523 | Grays River 7.5-min. | Wahkiakum | NW | 33 | 10 N. | 7 W. | foraminifers |
| 0524 | Skamokawa 7.5-min. | Wahkiakum | NE SE | 19 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0525 | Skamokawa 7.5-min | Wahkiakum | SW SW | 20 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0526 | Skamokawa 7.5-min. | Wahkiakum | SW NW | 28 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0527 | WDGER 8669 | 46°19'42" | 123°25'10" | Siltstone of Skamokawa Creek | Eocene - late | Narizian - late | --- | Rau (WDGER unpub. data) | |
| 0528 | WDGER 8672 | 46°20'10" | 123°24'58" | Siltstone of Skamokawa Creek | Eocene - late | Narizian - late | --- | Rau (WDGER unpub. data) | |
| 0529 | WDGER 8671 | 46°19'45" | 123°24'05" | Siltstone of Skamokawa Creek | Eocene - late | Narizian - late | *Bulimina schencki-Plectofrondicularia jenkinsi* | Rau (WDGER unpub. data) | |
| 0530 | WDGER 8643 | 46°20'30" | 123°15'00" | Cowlitz Formation | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0531 | WDGER 8625 | 46°22'55" | 123°05'15" | Cowlitz Formation | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0532 | M-580 | 46°23'00" | 123°04'00" | Cowlitz Fm. - Stillwater Creek Member | Eocene - late | --- | A-1 zone of Laiming (1943) | Henriksen (1956) | |
| 0533 | WDGER 8624 | 46°21'50" | 123°02'30" | Cowlitz Formation | Eocene - late | Narizian - late | *Bulimina schencki-Plectofrondicularia jenkinsi* | Rau (WDGER unpub. data) | |
| 0534 | P-1 | 46°21'35" | 122°56'02" | Cowlitz Formation | Eocene - late | --- | --- | Roberts (1958) | |
| 0535 | P-2 | 46°20'45" | 122°54'20" | Cowlitz Formation | Eocene - late | --- | --- | Roberts (1958) | |
| 0536 | M-585 | 46°20'05" | 122°55'45" | Cowlitz Fm. - Olequa Creek Member | Eocene - late | --- | A-1 zone of Laiming (1940) | Henriksen (1956) | |
| 0537 | F-1 | 46°20'07" | 122°55'55" | Cowlitz Formation | Eocene - late | Narizian | --- | Roberts (1958) | |
| 0538 | F-2 | 46°20'05" | 122°54'27" | Cowlitz Formation | Eocene - late | --- | --- | Roberts (1958) | |
| 0539 | --- | 46°19'15" | 122°54'30" | terrace deposit | Pleistocene - late | --- | --- | Roberts (1958) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0527 | Skamokawa 7.5-min. | Wahkiakum | NE NE | 28 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0528 | Skamokawa 7.5-min. | Wahkiakum | SW NW | 22 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0529 | Skamokawa 7.5-min. | Wahkiakum | SE SE | 22 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0530 | Border between Elochoman Lake and Skamokawa Pass 7.5-min. | Wahkiakum | NE NW | 24 | 10 N. | 5 W. | foraminifers; see also Wells (1981). According to Armentrout (1981), the Narizian benthonic foraminiferal stage is correlative to the middle and late Eocene. |
| 0531 | Wildwood 7.5-min. | Cowlitz | SW NW | 5 | 10 N. | 3 W. | foraminifers; see also Wells (1981). According to Armentrout (1981), the Narizian benthonic foraminiferal stage is correlative to the middle and late Eocene. |
| 0532 | Wildwood 7.5-min. | Cowlitz | NW | 4 | 10 N. | 3 W. | mollusks; traverse along Stillwater Creek. A-1 zone of Laiming (1943) is correlative to the Narizian benthonic foraminiferal stage (Almgren and others, 1988) which is equivalent to middle and late Eocene (Armentrout, 1981). |
| 0533 | Abernathy Mtn. 7.5-min. | Cowlitz | NE SW | 10 | 10 N. | 3 W. | foraminifers; see also Wells (1981) |
| 0534 | Castle Rock 7.5-min. | Cowlitz | NW NE | 16 | 10 N. | 2 W. | flora |
| 0535 | Castle Rock 7.5-min. | Cowlitz | SW SW | 14 | 10 N. | 2 W. | flora |
| 0536 | Castle Rock 7.5-min. | Cowlitz | NE SE | 21 | 10 N. | 2 W. | mollusks. A-1 zone of Laiming (1943) is correlative to the Narizian benthonic foraminiferal stage (Almgren and others, 1988) which is equivalent to middle and late Eocene (Armentrout, 1981). |
| 0537 | Castle Rock 7.5-min. | Cowlitz | NE SE | 21 | 10 N. | 2 W. | foraminifers by W. W. Rau |
| 0538 | Castle Rock 7.5-min. | Cowlitz | NE SE | 22 | 10 N. | 2 W. | foraminifers |
| 0539 | Castle Rock 7.5-min. | Cowlitz | SE SE | 27 | 10 N. | 2 W. | facial bone of a mammoth; *Mammuthus primigenius* (Blumenback) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0540 | M-3 | 46°18'40" | 122°55'10" | Cowlitz Formation | Eocene - late | --- | --- | Roberts (1958) | |
| 0541 | M-7 and M-8 | 46°20'25" | 122°51'15" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0542 | P-5 | 46°20'30" | 122°54'00" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0543 | P-6 | 46°20'45" | 122°53'57" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0544 | P-11 | 46°19'50" | 122°43'40" | Toutle Formation | Eocene and Oligocene | --- | --- | Roberts (1958) | |
| 0545 | P-12 | 46°22'35" | 122°41'30" | Wilkes Formation | Miocene | --- | --- | Roberts (1958) | |
| 0546 | WDGER 8102 | 46°16'12" | 123°54'45" | Crescent Formation | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0547 | WDGER 7818 | 46°15'20" | 123°55'20" | Sandstone at Megler | Eocene - middle | Narizian - early | --- | Rau (WDGER unpub. data) | |
| 0548 | WDGER 7823 | 46°15'15" | 123°54'50" | Sandstone at Megler | Eocene - middle | Narizian - early | --- | Rau (WDGER unpub. data) | |
| 0549 | WDGER 8100 | 46°16'15" | 123°49'50" | Siltstone and sandstone at Omeara Point | Eocene - late and late-middle | Narizian - late(?) | --- | Rau (WDGER unpub. data) | |
| 0550 | 5844 | 46°17'2" | 123°48'20" | Lincoln Creek Formation | Eocene - late | Galvinian | --- | Zullo (1982) | |
| 0551 | F-58 (4262) | 46°17'25" | 123°45'45" | Astoria Formation | Miocene - early and middle | Saucesian or Relizian | --- | Wolfe and McKee (1972) | |
| 0552 | M-37 (USGS Cenozoic locality M2515) | 46°18'35" | 123°45'02" | Astoria Fm. (Unit III) | Miocene - middle | Temblor (Newportian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0540 | Castle Rock 7.5-min. | Cowlitz | NE SW | 34 | 10 N. | 2 W. | mollusks |
| 0541 | Castle Rock 7.5-min. | Cowlitz | E 1/2 NW | 19 | 10 N. | 1 W. | mollusks |
| 0542 | Castle Rock 7.5-min. | Cowlitz | NE NW | 21 | 10 N. | 1 W. | flora |
| 0543 | Castle Rock 7.5-min. | Cowlitz | SE SW | 16 | 10 N. | 1 W. | flora |
| 0544 | Toutle 7.5-min. | Cowlitz | SW SE | 19 | 10 N. | 1 E. | flora |
| 0545 | Eden Valley 7.5-min. | Cowlitz | SW SW | 3 | 10 N. | 1 E. | flora |
| 0546 | Chinook 7.5-min. | Pacific | NE NE | 16 | 9 N. | 10 W. | foraminifers; see also Wells (1989) |
| 0547 | Chinook 7.5-min. | Pacific | NE NW | 21 | 9 N. | 10 W. | foraminifers; see also Wells (1989) |
| 0548 | Chinook 7.5-min. | Pacific | SW NE | 21 | 9 N. | 10 W. | foraminifers; see also Wells (1989) |
| 0549 | Knappton 7.5-min. | Pacific | NE NE | 18 | 9 N. | 9 W. | foraminifers; see also Wells (1989) |
| 0550 | Knappton 7.5-min. | Pacific | NW | 9 | 9 N. | 9 W. | fossil barnacles; correlative with the Refugian benthonic foraminiferal stage |
| 0551 | Knappton 7.5-min. | Pacific | NE SW | 2 | 9 N. | 9 W. | foraminifers; open-sea environment, water depths 500 to 2,000 ft. |
| 0552 | Knappton 7.5-min. | Pacific | SE NE | 35 | 10 N. | 9 W. | mud pectens; bathyal. Newportian molluscan stage is correlative to the late-early and middle Miocene (Addicott, 1981; Armentrout, 1981). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0553 | M-24 (USGS Cenozoic locality M2788) | 46°18'20" | 123°44'20" | Astoria Fm. (Unit I) | Miocene - middle | Temblor (Pillarian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0554 | M-25 (USGS Cenozoic locality M2790) | 46°17'45" | 123°43'25" | Astoria Fm. (Unit I) | Miocene - middle | Temblor (Pillarian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0555 | F-57 (4032) | 46°17'35" | 123°43'35" | Astoria Fm. (Unit III) | Miocene - early | Saucesian | --- | Wolfe and McKee (1972) | |
| 0556 | F-54 (WDGER 3895) | 46°16'40" | 123°40'40" | Astoria Fm. (Unit I) | Miocene - early | Saucesian | *Epistominella parva* | Wolfe and McKee (1972); Rau (1951) | |
| 0557 | M-30 (USGS Cenozoic localities M2517, M2588) | 46°16'45" | 123°38'40" | Astoria Fm. (Unit II) | Miocene - middle | Temblor (Newportian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0558 | F-55 (4207) | 46°15'45" | 123°37'30" | Astoria Fm. (Unit II) | Miocene - early | Saucesian | --- | Wolfe and McKee (1972) | |
| 0559 | M-21 (USGS Cenozoic locality M2782) | 46°17'40" | 123°36'45" | Lincoln Creek Formation | Oligocene | "Blakeley" - upper | *Echinophoria apta* | Wolfe and McKee (1972) | |
| 0560 | F-47 (4350) | 46°17'50" | 123°36'25" | Lincoln Creek Formation | Oligocene | Zemorrian | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0561 | M-35 (USGS Cenozoic locality M2567) | 46°15'40" | 123°35'25" | Astoria Fm. (Unit II) | Miocene - middle | Temblor (Newportian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0562 | F-56 (4259A) | 46°16'25" | 123°35'30" | Astoria Fm. (Unit II) | Miocene - early | Saucesian | --- | Wolfe and McKee (1972) | |
| 0563 | M-33 (USGS Cenozoic locality M2587) | 46°16'30" | 123°35'30" | Astoria Fm. (Unit II) | Miocene - middle | Temblor (Newportian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |
| 0564 | F-43 (3905) | 46°16'55" | 123°34'40" | Lincoln Creek Formation | Oligocene | Zemorrian? | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0565 | M-34 (USGS Cenozoic locality M2516) | 46°16'05" | 123°33'30" | Astoria Fm. (Unit II) | Miocene - middle | Temblor (Newportian) | --- | Wolfe and McKee (1972) | Moore & Addicott (1987), Addicott (1976) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0553 | Rosburg 7.5-min. | Pacific | NE SW | 36 | 10 N. | 9 W. | mollusks; relatively deep-water offshore facies. Pillarian molluscan stage is correlative to the early Miocene (Addicott, 1981; Armentrout, 1981). |
| 0554 | Rosburg 7.5-min. | Wahkiakum | SW NW | 6 | 9 N. | 8 W. | mollusks; relatively deep-water offshore facies. Pillarian molluscan stage is correlative to the early Miocene (Addicott, 1981; Armentrout, 1981). |
| 0555 | Rosburg 7.5-min. | Wahkiakum | NW SW | 6 | 9 N. | 8 W. | foraminifers; water depths 100 to 500 ft.. Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). |
| 0556 | Rosburg 7.5-min. | Wahkiakum | center | 9 | 9 N. | 8 W. | foraminifers; relatively deep-water offshore facies. Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). The broad *Epistominella parva* zone was subdivided into three zones by Rau (1967). |
| 0557 | Rosburg 7.5-min. | Wahkiakum | SW NW | 11 | 9 N. | 8 W. | mollusks; nearshore shallow-water facies. Newportian molluscan stage is correlative to the late-early and middle Miocene (Addicott, 1981; Armentrout, 1981). |
| 0558 | Rosburg 7.5-min. | Wahkiakum | NE SE | 14 | 9 N. | 8 W. | foraminifers; nearshore shallow-water facies. Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). |
| 0559 | Rosburg 7.5-min. | Wahkiakum | SW NE | 1 | 9 N. | 8 W. | mollusks; upper "Blakeley" stage of Wolfe and McKee (1972)(*Echinophoria apta* zone) is equivalent to Juanian molluscan stage of Armentrout (1981). |
| 0560 | Grays River 7.5-min. | Wahkiakum | NE | 1 | 9 N. | 8 W. | foraminifers |
| 0561 | Grays River 7.5-min. | Wahkiakum | NE SE | 18 | 9 N. | 7 W. | mollusks; nearshore shallow-water facies. Newportian molluscan stage is correlative to the late-early and middle Miocene (Addicott, 1981; Armentrout, 1981). |
| 0562 | Grays River 7.5-min. | Wahkiakum | SE SE | 7 | 9 N. | 7 W. | foraminifers; nearshore shallow-water facies. Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). |
| 0563 | Grays River 7.5-min. | Wahkiakum | NE SE | 7 | 9 N. | 7 W. | mollusks; nearshore shallow-marine facies. Newportian molluscan stage is correlative to the late-early and middle Miocene (Addicott, 1981; Armentrout, 1981). |
| 0564 | Grays River 7.5-min. | Wahkiakum | center N1/2 | 8 | 9 N. | 7 W. | foraminifers |
| 0565 | Grays River 7.5-min. | Wahkiakum | SE NW | 16 | 9 N. | 7 W. | mollusks; nearshore shallow-water facies. Newportian molluscan stage is correlative to the late-early and middle Miocene (Addicott, 1981; Armentrout, 1981). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0566 | F-42 (3906) | 46°17'50" | 123°34'05" | Lincoln Creek Formation | Oligocene | Zemorrian? | *Pseudoglandulina* aff. *P. inflata* | Wolfe and McKee (1972) | |
| 0567 | F-41 (3898) | 46°17'55" | 123°32'55" | Lincoln Creek Formation | Oligocene | Zemorrian? | --- | Wolfe and McKee (1972) | |
| 0568 | M-19 (USGS Cenozoic locality M2784) | 46°17'55" | 123°32'55" | Lincoln Creek Formation | Oligocene | "Blakeley" - upper | *Echinophoria apta* | Wolfe and McKee (1972) | |
| 0569 | F-34 (4260) | 46°17'45" | 123°29'25" | Lincoln Creek Fm. (lower basaltic sandstone) | Eocene - late | Refugian | --- | Wolfe and McKee (1972) | |
| 0570 | M-36 (USGS Cenozoic locality M2513) | 46°16'50" | 123°29'30" | Astoria Formation | Miocene - middle | Temblor | --- | Wolfe and McKee (1972) | |
| 0571 | WDGER 8666 | 46°17'45" | 123°24'10" | Siltstone of Skamokawa Creek | Eocene - late | Narizian - late | --- | Rau (WDGER unpub. data) | |
| 0572 | WDGER 8667 | 46°17'45" | 123°23'25" | Siltstone of Skamokawa Creek | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0573 | WDGER 8663 | 46°18'15" | 123°22'10" | Siltstone of Skamokawa Creek | Eocene - late | Narizian | --- | Rau (WDGER unpub. data) | |
| 0574 | WDGER 8659 | 46°18'00" | 123°21'30" | Siltstone of Skamokawa Creek | Eocene - late | Narizian? | --- | Rau (WDGER unpub. data) | |
| 0575 | WDGER 8661 | 46°17'50" | 123°20'40" | Siltstone of Skamokawa Creek | Eocene - late | Narizian | *Uvigerina yazooensis* | Rau (WDGER unpub. data) | |
| 0576 | WDGER 8870 | 46°16'45" | 123°23'05" | Lincoln Creek Fm. (basal sandstone) | Eocene - late | Refugian - early | --- | Rau (WDGER unpub. data) | |
| 0577 | M595 | 46°13'50" | 123°30'15" | Gnat Creek formation | Miocene - middle or younger | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0578 | 29 | 46°12'10" | 123°26'58" | Gnat Creek formation | Miocene - probably middle | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0566 | Grays River 7.5-min. | Wahkiakum | NE | 5 | 9 N. | 7 W. | foraminifers |
| 0567 | Grays River 7.5-min. | Wahkiakum | N1/2 NE | 4 | 9 N. | 7 W. | foraminifers |
| 0568 | Grays River 7.5-min. | Wahkiakum | N1/2 NE | 4 | 9 N. | 7 W. | mollusks; upper "Blakeley" stage of Wolfe and McKee (1972)(*Echinophoria apta* zone) is equivalent to Juanian molluscan stage of Armentrout (1981) |
| 0569 | Skamokawa 7.5-min. | Wahkiakum | SW NE | 1 | 9 N., | 7 W. | foraminifers |
| 0570 | Skamokawa 7.5-min. | Wahkiakum | SE NW | 12 | 9 N. | 7 W. | mollusks |
| 0571 | Skamokawa 7.5-min. | Wahkiakum | SE NE | 3 | 9 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0572 | Skamokawa 7.5-min. | Wahkiakum | NE NW | 2 | 9 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0573 | Skamokawa Pass 7.5-min | Wahkiakum | NE SW | 36 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0574 | Skamokawa Pass 7.5-min. | Wahkiakum | SE SE | 36 | 10 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0575 | Skamokawa Pass 7.5-min. | Wahkiakum | NW NE | 6 | 9 N. | 5 W. | foraminifers; see also Wells (1981) |
| 0576 | Skamokawa 7.5-min. | Wahkiakum | NW SE | 11 | 9 N. | 6 W. | foraminifers; see also Wells (1981) |
| 0577 | Knappa 7.5-min. | Clatsop | NW SW | 25 | 9 N. | 7 W. | diatoms; identified by John Barron (USGS); informal Clifton formation of Murphy (1981) |
| 0578 | Cathlamet 7.5-min. | Clatsop | NE SE | 5 | 8 N. | 6 W. | diatoms; identified by John Barron (USGS); informal Clifton formation of Murphy (1981) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0579 | 24 and 25 | 46°11'58" | 123°26'45" | Gnat Creek formation | Miocene - middle | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0580 | 17 | 46°11'40" | 123°26'30" | Gnat Creek formation | Miocene - middle | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0581 | M602 | 46°12'00" | 123°29'15" | Gnat Creek formation | Miocene - middle | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0582 | 519 | 46°11'45" | 123°28'15" | Gnat Creek formation | Miocene - middle | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0583 | 513 | 46°11'35" | 123°28'30" | Gnat Creek formation | Miocene - middle | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0584 | 547 | 46°10'40" | 123°27'45" | Gnat Creek formation | Miocene - middle | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0585 | 24 (USGS Cenozoic loc. no. 5339) | 46°11'10" | 123°51'20" | Astoria Fm., Cannon Beach Member | Miocene | --- | --- | Moore (1963) | see also Niem and Niem (1985) |
| 0586 | D-1764 | 46°11'22" | 123°50'55" | Astoria Fm., Cannon Beach Member | Miocene - early | Zemorrian - Saucesian | --- | Gonsalves (1965) | see also Niem and Niem (1985) |
| 0587 | D-1766 | 46°11'20" | 123°50'30" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian - early | --- | Gonsalves (1965) | see also Niem and Niem (1985) |
| 0588 | 9th and Harrison Sts. | 46°11'10" | 123°50'02" | Astoria Fm., Cannon Beach Member | Miocene - early middle | Saucesian or Relizian | --- | Niem and others (1973) | |
| 0589 | D-1774 | 46°11'10" | 123°49'15" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian - early | --- | Gonsalves (1965) | see also Niem and Niem (1985) |
| 0590 | 18 (USGS Cenozoic loc. no. 5322) | 46°11'20" | 123°48'10" | Astoria Fm., Cannon Beach Member | Miocene | --- | --- | Moore (1963) | see also Niem and Niem (1985) |
| 0591 | WDGER 1958 | 46°11'30" | 123°47'38" | Astoria Formation | Miocene - early | Saucesian | --- | Rau (WDGER unpub. data) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0579 | Cathlamet 7.5-min.. | Clatsop | NE NE | 8 | 8 N. | 6 W. | diatoms; identified by John Barron (USGS); may be correlative with the Relizian to Luisian benthonic foraminiferal stages; informal Clifton formation of Murphy (1981) |
| 0580 | Cathlamet 7.5-min. | Clatsop | SW NW | 9 | 8 N. | 6 W. | diatoms; identified by John Barron (USGS); may be correlative with the Relizian to Luisian benthonic foraminiferal stages; informal Clifton formation of Murphy (1981) |
| 0581 | Cathlamet 7.5-min. | Clatsop | SE SE | 1 | 8 N. | 7 W. | diatoms; identified by John Barron (USGS); informal Clifton formation of Murphy (1981) |
| 0582 | Cathlamet 7.5-min. | Clatsop | SW NE | 7 | 8 N. | 6 W. | diatoms; identified by John Barron (USGS); informal Clifton formation of Murphy (1981) |
| 0583 | Cathlamet 7.5-min. | Clatsop | center | 7 | 8 N. | 6 W. | diatoms; identified by John Barron (USGS); may be correlative with the Mohnian to Luisian benthonic foraminiferal stages; informal Clifton formation of Murphy (1981) |
| 0584 | Cathlamet 7.5-min. | Clatsop | SW NW | 17 | 8 N. | 6 W. | diatoms;identified by John Barron (USGS); may be correlative with the Mohnian to Luisian benthonic foraminiferal stages; informal Clifton formation of Murphy (1981) |
| 0585 | Astoria 7.5-min. | Clatsop | SW | 7 | 8 N. | 9 W. | mollusks collected by G. A. Macready in 1910 |
| 0586 | Astoria 7.5-min. | Clatsop | NE SW | 7 | 8 N. | 9 W. | foraminifers; Gonsalves (1965) called these strata Astoria Fm. |
| 0587 | Astoria 7.5-min. | Clatsop | NW SE | 7 | 8 N. | 9 W. | foraminifers; Gonsalves (1965) called these strata Astoria Fm. |
| 0588 | Astoria 7.5-min. | Clatsop | SW SW | 8 | 8 N. | 9 W. | foraminifers by W. W. Rau; upper part of bathyal (>1,000 ft water depths); informal Silver Point member, Astoria Fm. in Niem and others (1973). |
| 0589 | Astoria 7.5-min. | Clatsop | SW SE | 8 | 8 N. | 9 W. | foraminifers; Gonsalves (1965) called these strata Astoria Fm. |
| 0590 | Astoria 7.5-min. | Clatsop | NW SE | 9 | 8 N. | 9 W. | mollusks collected by R. F. Rogers in 1910; middle shale member of Astoria Fm. of Howe (1926) in Moore (1963). |
| 0591 | Astoria 7.5-min. | Clatsop | SW NW | 10 | 8 N. | 9 W. | foraminifers; typical Astoria fauna. Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0592 | 27 (USGS Cenozoic loc. no. 19042) | 46°11'35" | 123°46'00" | Astoria Fm., Youngs Bay Member | Miocene | --- | --- | Moore (1963) | see also Niem and Niem (1985) |
| 0593 | TP-1 | 46°11'12" | 123°45'30" | Astoria Fm., Youngs Bay Member | Miocene - early and early-middle | Saucesian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0594 | 28 (USGS Cenozoic loc. no. 5324) | 46°10'30" | 123°44'10" | Astoria Fm., Youngs Bay Member (lower arkosic sandstone) | Miocene | --- | --- | Moore (1963) | see also Niem and Niem (1985) |
| 0595 | D-1777 | 46°10'35" | 123°50'45" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian - early | --- | Gonsalves (1965) | see also Niem and Niem (1985) |
| 0596 | 213 | 46°10'40" | 123°51'05" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0597 | 9-4 | 46°10'20" | 123°50'08" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0598 | 26 (USGS Cenozoic loc. no. 5332 | 46°10'15" | 123°48'30" | Astoria Fm., Youngs Bay Member | Miocene | --- | --- | Moore (1963) | see also Niem and Niem (1985) |
| 0599 | SRQ-1 | 46°10'45" | 123°48'48" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0600 | D-1778 | 46°10'15" | 123°47'30" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Gonsalves (1965) | see also Niem and Niem (1985) |
| 0601 | 406 | 46°09'45" | 123°47'15" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0602 | 345 | 46°09'55" | 123°42'00" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian - early | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0603 | N84-159 | 46°09'55" | 123°42'00" | Astoria Fm., Cannon Beach Member | Miocene | Pillarian or Newportian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0604 | 29 (USGS Cenozoic loc. no. 5325) | 46°10'12" | 123°41'15" | Astoria Fm., Cannon Beach Member | Miocene | --- | --- | Moore (1963) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0592 | Astoria 7.5-min. | Clatsop | NE NW | 11 | 8 N. | 9 W. | mollusks; undifferentiated Astoria Fm. in Moore (1963) |
| 0593 | Astoria 7.5-min. | Clatsop | center | 11 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau; upper to middle bathyal (1,000 to 5,000 ft water depths) |
| 0594 | Cathlamet Bay 7.5-min. | Clatsop | NE SE | 13 | 8 N. | 9 W. | mollusks; undifferentiated Astoria Fm. in Moore (1963) |
| 0595 | Astoria 7.5-min. | Clatsop | NW SE | 18 | 8 N. | 9 W. | foraminifers; Gonsalves (1965) called these strata Astoria Fm. |
| 0596 | Astoria 7.5-min. | Clatsop | SE NW | 18 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); middle bathyal; informal Silver Point member, Astoria Fm. of Cooper (1981). Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). |
| 0597 | Astoria 7.5-min. | Clatsop | SW SW | 17 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); bathyal; informal Big Creek member (deep-marine facies), Astoria Fm. of Cooper (1981). Saucesian benthonic foraminiferal stage is correlative to the early and early-middle Miocene (Armentrout, 1981). |
| 0598 | Astoria 7.5-min. | Clatsop | NE NW | 21 | 8 N. | 9 W. | mollusks; undifferentiated Astoria Fm. in Moore (1963) |
| 0599 | Astoria 7.5-min. | Clatsop | SW NW | 16 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau. Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0600 | Astoria 7.5-min. | Clatsop | SW SW | 15 | 8 N. | 9 W. | foraminifers; Gonsalves (1965) called these strata Astoria Fm. Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0601 | Astoria 7.5-min. | Clatsop | NE SW | 22 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); probably bathyal depths (slope); informal Pipeline member, Astoria Fm. of Nelson (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0602 | Cathlamet Bay 7.5-min. | Clatsop | SW NE | 20 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); indicate upper bathyal (upper slope) to outer shelf conditions; informal Silver Point member, Astoria Fm. of Nelson (1978) |
| 0603 | Cathlamet Bay 7.5-min. | Clatsop | SW NE | 20 | 8 N. | 8 W. | mollusks; identified by E. J. Moore (USGS) |
| 0604 | Cathlamet Bay 7.5-min. | Clatsop | NW NW | 21 | 8 N. | 8 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0605 | 208 | 46°10'25" | 123°40'35" | Astoria Fm., Cannon Beach Member | Miocene | Pillarian or Newportian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0606 | 9-3-423 | 46°09'45" | 123°41'30" | Astoria Fm., Cannon Beach Member | Miocene | Newportian or Wishkahan | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0607 | MC 215 | 46°09'15" | 123°39'15" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0608 | M1 (USNM 15521) | 46°08'45" | 123°54'08" | Astoria Formation | Miocene | --- | --- | Warren and others (1945) | Moore (1963); Niem and Niem (1985) |
| 0609 | WDGER 1964 | 46°08'08" | 123°52'57" | Smuggler Cove formation | Eocene - late | Refugian | *Sigmomorphina schencki* | Rau (WDGER unpub. data) | |
| 0610 | 214 | 46°09'30" | 123°50'00" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0611 | 123-8-74 | 46°09'10" | 123°46'40" | Astoria Fm., Youngs Bay Member | Miocene - early or middle | Saucesian or Relizian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0612 | 344 | 46°09'20" | 123°42'30" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0613 | 350 | 46°08'45" | 123°42'15" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0614 | N84-157 | 46°08'45" | 123°42'15" | Astoria Fm., Cannon Beach Member | Miocene | --- | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0615 | 101-8-74 (USGS Cenozoic loc. M6397) | 46°08'45" | 123°35'20" | Astoria Fm., Cannon Beach Member | Miocene, possibly | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0616 | 91 | 46°09'25" | 123°35'10" | Astoria Fm., Cannon Beach Member | Miocene | Pillarian or Newportian | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0617 | 132 | 46°07'45" | 123°53'50" | Smuggler Cove formation | Oligocene or older | --- | --- | Nelson (1978) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0605 | Cathlamet Bay 7.5-min. | Clatsop | SW SE | 16 | 8 N. | 8 W. | mollusks |
| 0606 | Cathlamet Bay 7.5-min. | Clatsop | NE SE | 20 | 8 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Silver Point member, Astoria Fm. of Nelson (1978) |
| 0607 | Cathlamet Bay 7.5-min. | Clatsop | NE NE | 27 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Cooper (1981). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0608 | Warrenton 7.5-min. | Clatsop | NE SE | 27 | 8 N. | 10 W. | mollusks |
| 0609 | Warrenton 7.5-min. | Clatsop | SE SW | 26 | 8 N. | 10 W. | foraminifers |
| 0610 | Astoria 7.5-min. | Clatsop | SW SW | 20 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); informal Big Creek member (deep-marine facies), Astoria Fm. of Cooper (1981). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0611 | Astoria 7.5-min. | Clatsop | NE NE | 27 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); bathyal; informal Big Creek member (deep-marine facies), Astoria Fm. of Cooper (1981) |
| 0612 | Cathlamet Bay 7.5-min. | Clatsop | NW NW | 29 | 8 N. | 8 W. | foraminifers; informal Silver Point member, Astoria Fm. of Nelson (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0613 | Cathlamet Bay 7.5-min. | Clatsop | NE SW | 29 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Nelson (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0614 | Cathlamet Bay 7.5-min. | Clatsop | NE SW | 29 | 8 N. | 8 W. | diatoms; identified by John Barron (USGS) |
| 0615 | Knappa 7.5-min. | Clatsop | NE SE | 30 | 8 N. | 7 W. | mollusks; identified by E. J. Moore (USGS); informal Silver Point member, Astoria Fm. of Cooper (1981) |
| 0616 | Knappa 7.5-min. | Clatsop | NW NW | 29 | 8 N. | 7 W. | mollusks; identified by W. O. Addicott (USGS); informal Silver Point member, Astoria Fm. of Murphy (1981) |
| 0617 | Warrenton 7.5-min. | Clatsop | SW SW | 35 | 8 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1978) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0618 | 122 | 46°07'30" | 123°53'35" | Smuggler Cove formation | Eocene or Oligocene | Galvinian or Matlockian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0619 | 180 | 46°07'50" | 123°50'20" | Astoria Fm., Cannon Beach Member | Miocene | Saucesian, possibly Zemorrian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0620 | 430 | 46°08'20" | 123°47'40" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian - early | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0621 | 125-8-74 | 46°08'05" | 123°44'15" | Astoria Fm., Youngs Bay Member | Miocene - early or middle | Saucesian or Relizian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0622 | AOS74-5 | 46°08'05" | 123°44'15" | Astoria Fm., Youngs Bay Member | Miocene - middle or late | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0623 | 356 | 46°07'55" | 123°43'10" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0624 | 358 | 46°08'02" | 123°42'50" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0625 | 334 | 46°08'25" | 123°41'52" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0626 | 7-28-320 | 46°07'52" | 123°41'30" | Astoria Fm., Youngs Bay Member | Miocene | Newportian or Wishkahan | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0627 | 314 | 46°07'45" | 123°42'28" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0628 | 108 | 46°08'00" | 123°40'40" | Astoria Fm., Youngs Bay Member | Miocene - early | Saucesian | --- | Coryell (1978) | see also Niem and Niem (1985) |
| 0629 | 76-128 | 46°07'52" | 123°39'45" | Astoria Fm., Youngs Bay Member | Miocene | Newportian or Wishkahan | --- | Coryell (1978) | see also Niem and Niem (1985) |
| 0630 | 233 (USGS Cenozoic locality M7698) | 46°08'00" | 123°36'00" | Astoria Fm., Cannon Beach Member | Miocene - early or middle | Pillarian or Newportian | --- | Murphy (1981) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0618 | Warrenton 7.5-min. | Clatsop | NW NW | 2 | 7 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1978) |
| 0619 | Astoria 7.5-min. | Clatsop | NE SE | 31 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER), outer shelf to slope; informal Silver Point member, Astoria Fm. of Nelson (1978) |
| 0620 | Astoria 7.5-min. | Clatsop | NE NE | 33 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); middle to upper bathyal (slope); informal Pipeline member, Astoria Fm. of Nelson (1978) |
| 0621 | Cathlamet Bay 7.5-min. | Clatsop | SE NW | 36 | 8 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER), bathyal; informal Big Creek member (deep-marine facies), Astoria Fm. of Cooper (1981) |
| 0622 | Cathlamet Bay 7.5-min. | Clatsop | SE NW | 36 | 8 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member (deep-marine facies), Astoria Fm. of Cooper (1981) |
| 0623 | Cathlamet Bay 7.5-min. | Clatsop | NW SE | 31 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); indicate bathyal (slope) conditions; informal Pipeline member, Astoria Fm. of Nelson (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0624 | Cathlamet Bay 7.5-min. | Clatsop | NE SE | 31 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); indicate deep water - bathyal (slope); informal Pipeline member, Astoria Fm. of Nelson (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0625 | Cathlamet Bay 7.5-min. | Clatsop | NW NE | 32 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); indicate bathyal conditions; informal Pipeline member, Astoria Fm. of Nelson (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0626 | Cathlamet Bay 7.5-min. | Clatsop | NE SE | 32 | 8 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Pipeline member, Astoria Fm. of Nelson (1978) |
| 0627 | Cathlamet Bay 7.5-min. | Clatsop | SW SW | 32 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); indicate deep water; mid- to upper bathyal (slope); informal Pipeline member, Astoria Fm. of Nelson (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0628 | Cathlamet Bay 7.5-min. | Clatsop | NW SE | 33 | 8 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); informal Pipeline member, Astoria Fm. of Coryell (1978). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0629 | Cathlamet Bay 7.5-min. | Clatsop | NE SW | 34 | 8 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Pipeline member, Astoria Fm. of Coryell (1978) |
| 0630 | Knappa 7.5-min. | Clatsop | N 1/2 SW | 31 | 8 N. | 7 W. | mollusks; identified by E. J. Moore (USGS); informal Silver Point member, Astoria Fm. of Murphy (1981) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0631 | 99-8-74 | 46°08'00" | 123°36'00" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0632 | 366 | 46°08'20" | 123°35'10" | Astoria Fm., Cannon Beach Member | Miocene | --- | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0633 | 367a | 46°08'25" | 123°34'45" | Astoria Fm., Cannon Beach Member | Miocene - early or middle | Saucesian or younger | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0634 | 236 (USGS Cenozoic locality M7699) | 46°08'45" | 123°34'05" | Astoria Fm., sedimentary interbed in Frenchman Springs Basalt | Miocene | Matlockian - late or Juanian | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0635 | M2 (USNM 15455) | 46°08'40" | 123°34'06" | Astoria Formation | Miocene | --- | --- | Warren and others (1945) | |
| 0636 | 31-7-74 | 46°07'22" | 123°54'22" | Smuggler Cove formation | Oligocene, probably | Zemorrian, probably | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0637 | 109 | 46°07'15" | 123°54'12" | Smuggler Cove formation | Eocene to Oligocene | Galvinian or Matlockian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0638 | 87 | 46°06'45" | 123°53'20" | Smuggler Cove formation | Oligocene or younger | --- | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0639 | 6-24-18 | 46°05'55" | 123°53'32" | Astoria Fm., Wickiup Mountain Member? | Miocene - early or middle | Pillarian or Newportian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0640 | 6-29-82 | 46°06'25" | 123°52'55" | Astoria Formation | Miocene to Pliocene | --- | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0641 | 6-30-78 | 46°06'15" | 123°52'50" | Astoria Formation | Miocene - early or middle | Pillarian or Newportian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0642 | 67 | 46°05'30" | 123°52'50" | Smuggler Cove formation | Eocene - late or Oligocene | Galvinian or Matlockian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0643 | 7-12-191 | 46°07'02" | 123°49'45" | Smuggler Cove formation | Oligocene | Galvinian | --- | Nelson (1978) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0631 | Knappa 7.5-min. | Clatsop | N 1/2 SW | 31 | 8 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER); indicate bathyal conditions; informal Silver Point member, Astoria Fm. of Cooper (1981). Saucesian benthonic foraminiferal stage is correlative to early and early-middle Miocene (Armentrout, 1981). |
| 0632 | Knappa 7.5-min. | Clatsop | NW NW | 32 | 8 N. | 7 W. | mollusks; identified by E. J. Moore (USGS); informal Silver Point member, Astoria Fm. of Murphy (1981) |
| 0633 | Knappa 7.5-min. | Clatsop | NE NW | 32 | 8 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Murphy (1981) |
| 0634 | Knappa 7.5-min. | Clatsop | NE SE | 29 | 8 N. | 7 W. | mollusks; identified by E. J. Moore (USGS); diatoms from same locality = late early Miocene to Recent |
| 0635 | Knappa 7.5-min. | Clatsop | SE SE | 29 | 8 N. | 7 W. | mollusks |
| 0636 | Gearhart 7.5-min. | Clatsop | center NE | 3 | 7 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER), shelf to upper slope; informal Oswald West mudstone of Cooper (1981) |
| 0637 | Gearhart 7.5-min. | Clatsop | SE NE | 3 | 7 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1978) |
| 0638 | Gearhart 7.5-min. | Clatsop | SE SW | 2 | 7 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1978) |
| 0639 | Gearhart 7.5-min. | Clatsop | SE SW | 11 | 7 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Nelson (1978) |
| 0640 | Gearhart 7.5-min. | Clatsop | SE NE | 11 | 7 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0641 | Gearhart 7.5-min. | Clatsop | NE SE | 11 | 7 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0642 | Gearhart 7.5-min. | Clatsop | SE NE | 14 | 7 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1978) |
| 0643 | Olney 7.5-min. | Clatsop | NE SW | 5 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1978) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0644 | 7-12-190 | 46°06'40" | 123°49'40" | Smuggler Cove formation | Oligocene | Galvinian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0645 | 7-4-154 | 46°05'50" | 123°49'12" | Smuggler Cove formation | Oligocene - early | Matlockian - early | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0646 | 7-16-243 | 46°07'05" | 123°45'08" | Astoria Fm., Wickiup Mountain Member | Miocene - early | Pillarian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0647 | 7-16-239 | 46°07'05" | 123°44'40" | Astoria Fm., Wickiup Mountain Member | Miocene - early or middle | Pillarian or Newportian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0648 | 256 | 46°06'40" | 123°44'50" | Smuggler Cove formation | Oligocene to Miocene - early | Zemorrian or Saucesian - early | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0649 | 277 | 46°07'15" | 123°43'52" | Smuggler Cove formation | Oligocene - late to Miocene - early | Zemorrian - late to Saucesian - early | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0650 | 7-25-273 | 46°06'50" | 123°43'50" | Astoria Fm., Wickiup Mountain Member | Miocene - early or middle | Pillarian or Newportian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0651 | 70-8 | 46°05'25" | 123°42'55" | Smuggler Cove formation | Oligocene - late | Zemorrian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0652 | 67-8-74 | 46°07'20" | 123°42'20" | Astoria Fm., Youngs Bay Member | Miocene - early and early-middle | Saucesian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0653 | 7-24-272 | 46°06'45" | 123°42'20" | Astoria Fm., Wickiup Mountain Member | Miocene - early or middle | Pillarian or Newportian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0654 | 7-25-288 | 46°06'46" | 123°41'30" | Astoria Fm., Wickiup Mountain Member | Miocene - early or middle | Pillarian or Newportian | --- | Nelson (1978) | see also Niem and Niem (1985) |
| 0655 | 212.9.75 | 46°07'30" | 123°39'50" | Astoria Fm., Youngs Bay Member | Miocene - late-early and middle | Newportian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0656 | 76-130 | 46°06'50" | 123°40'00" | Astoria Fm., Wickiup Mountain Member | Miocene - late-early and middle | Newportian | --- | Coryell (1978) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0644 | Olney 7.5-min. | Clatsop | SW SE | 5 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1978) |
| 0645 | Olney 7.5-min. | Clatsop | NE NE | 17 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Nelson (1985) |
| 0646 | Olney 7.5-min. | Clatsop | NW SW | 1 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Nelson (1978) |
| 0647 | Green Mountain 7.5-min. | Clatsop | NE SW | 1 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Nelson (1978) |
| 0648 | Green Mountain 7.5-min. | Clatsop | NE NW | 12 | 7 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); middle to upper bathyal (mid- to upper slope); informal Oswald West mudstone of Nelson (1978) |
| 0649 | Green Mountain 7.5-min. | Clatsop | SW NW | 6 | 7 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); poor assemblage; middle to upper bathyal (slope); informal Oswald West mudstone of Nelson (1978) |
| 0650 | Green Mountain 7.5-min. | Clatsop | SW SW | 6 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Nelson (1978) |
| 0651 | Green Mountain 7.5-min. | Clatsop | SE NE | 18 | 7 N. | 8 W. | Klaskanine Fish Hatchery; foraminifers; identified by W. W. Rau (WDGER); informal Oswald West mudstone of Cooper (1981) |
| 0652 | Green Mountain 7.5-min. | Clatsop | center NW | 5 | 7 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); informal Big Creek member (deep-marine facies), Astoria Fm. of Cooper (1981) |
| 0653 | Green Mountain 7.5-min. | Clatsop | SE SW | 5 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Nelson (1978) |
| 0654 | Green Mountain 7.5-min. | Clatsop | SE SE | 5 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Nelson (1978) |
| 0655 | Border between Green Mountain and Cathlamet Bay 7.5-min. | Clatsop | NE NW | 3 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member (deep-marine facies), Astoria Fm. of Cooper (1981) |
| 0656 | Green Mountain 7.5-min. | Clatsop | SW SW | 3 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Coryell (1978) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0657 | AOS 74-4 (USGS Cenozoic loc. M6389) | 46°07'15" | 123°38'15" | Astoria Fm., Wickiup Mountain Member | Miocene - late-early and middle | Newportian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0658 | SR 64-152 | 46°07'15" | 123°38'15" | Astoria Fm., Wickiup Mountain Member | Miocene - early and early-middle | Saucesian | --- | W. W. Rau (WDGER unpub. data) | |
| 0659 | AOS 74-3 (USGS Cenozoic loc. M6388) | 46°06'15" | 123°37'40" | Astoria Fm., Wickiup Mountain Member | Miocene | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0660 | 76-37 | 46°06'22" | 123°36'45" | Astoria Fm., Wickiup Mountain Member | Oligocene - late to Miocene - late | --- | --- | Coryell (1978) | see also Niem and Niem (1985) |
| 0661 | N84-87 | 46°07'05" | 123°34'45" | Astoria Fm., Cannon Beach Member; interbedded with Columbia River Basalts | Miocene | --- | --- | A. R. Niem (unpub. data) | |
| 0662 | 76-129 | 46°07'05" | 123°34'45" | Astoria Fm., Cannon Beach Member, interbedded with Columbia River Basalts | Miocene - early or middle | Pillarian or Newportian | --- | Coryell (1978) | see also Niem and Niem (1985) |
| 0663 | 76-131 | 46°07'40" | 123°32'25" | Astoria Fm., Wickiup Mountain Member | Miocene - late-early and middle | Newportian | --- | Coryell (1978) | see also Niem and Niem (1985) |
| 0664 | BC-5 | 46°07'40" | 123°32'25" | Astoria Fm., Wickiup Mountain Member | Miocene - early or middle | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0665 | BC-3 | 46°06'00" | 123°33'05" | Astoria Fm., Wickiup Mountain Member | Miocene - middle | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0666 | AOS 74-2 | 46°06'45" | 123°31'40" | Astoria Fm., Wickiup Mountain Member | Miocene - middle | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0667 | 210.9.75 | 46°06'25" | 123°31'42" | Astoria Fm., Wickiup Mountain Member | Oligocene - late to Miocene - middle | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0668 | 109.8 | 46°05'35" | 123°31'00" | Smuggler Cove formation | Miocene - early | Saucesian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0669 | 209.9.75 | 46°05'50" | 123°30'25" | Smuggler Cove formation | Oligocene | Matlockian | --- | Cooper (1981) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0657 | Green Mountain 7.5-min. | Clatsop | center | 2 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Cooper (1981) |
| 0658 | Green Mountain 7.5-min. | Clatsop | center | 2 | 7 N. | 8 W. | foraminifers |
| 0659 | Green Mountain 7.5-min. | Clatsop | NW SW | 12 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek membe, Astoria Fm. of Cooper (1981) |
| 0660 | Wickiup Mtn. 7.5-min. | Clatsop | NE SE | 12 | 7 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Coryell (1978) |
| 0661 | Wickiup Mtn. 7.5-min. | Clatsop | NE SW | 5 | 7 N. | 7 W. | north slope of Wickiup Mountain; diatoms; identified by John Barron (USGS); may be correlative with the Relizian benthonic foraminiferal stage |
| 0662 | Wickiup Mtn. 7.5-min. | Clatsop | NE SW | 5 | 7 N. | 7 W. | north slope of Wickiup Mountain; mollusks; identified by W. O. Addicott (USGS) |
| 0663 | Knappa 7.5-min. | Clatsop | NW NW | 3 | 7 N. | 7 W. | Big Creek; mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Coryell (1978) |
| 0664 | Knappa 7.5-min. | Clatsop | NW NW | 3 | 7 N. | 7 W. | Big Creek; mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Cooper (1981) |
| 0665 | Wickiup Mtn. 7.5-min. | Clatsop | SESE | 9 | 7 N. | 7 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Cooper (1981) |
| 0666 | Wickiup Mtn. 7.5-min. | Clatsop | NE NE | 10 | 7 N. | 7 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Cooper (1981) |
| 0667 | Wickiup Mtn. 7.5-min. | Clatsop | SE NE | 10 | 7 N. | 7 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Cooper (1981) |
| 0668 | Wickiup Mtn. 7.5-min. | Clatsop | SE NW | 14 | 7 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0669 | Wickiup Mtn. 7.5-min. | Clatsop | NE NE | 23 | 7 N. | 7 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Cooper (1981) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0670 | K84-10 | 46°04'15" | 123°28'00" | Smuggler Cove formation | Eocene - late | Galvinian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0671 | M7 (USNM 15507) | 46°05'05" | 123°25'00" | Beds of Blakeley Age | Oligocene-Miocene | --- | --- | Warren and others (1945) | |
| 0672 | 312 (USGS Cenozoic locality M7708) | 46°05'05" | 123°25'00" | Northrup Creek formation | Oligocene | Juanian | --- | Murphy (1981) | see also Niem and Niem (1985) |
| 0673 | 259 (USGS Cenozoic locality M7704) | 46°07'45" | 123°24'30" | Astoria Formation | Oligocene - late to Miocene - middle | Juanian, Pillarian, or Newportian | --- | Murphy (1981) | |
| 0674 | M3 & M4 (USNM 15506 & 15528) | 46°07'40" | 123°23'30" | Beds of Blakeley age | Oligocene-Miocene | --- | *Echinophoria rex* & *E. apta* | Warren and others (1945) | |
| 0675 | 64 | 46°07'40" | 123°23'30" | Astoria Fm., Wickiup Mountain Member | Miocene to Recent | --- | --- | Murphy (1981) | |
| 0676 | 692 | 46°07'40" | 123°23'05" | Astoria Formation | Miocene - early or middle | Pillarian or Newportian | --- | Murphy (1981) | |
| 0677 | 241 | 46°07'45" | 123°22'35" | Smuggler Cove formation | Oligocene | Juanian | --- | Murphy (1981) | |
| 0678 | M6 (USNM 15586) | 46°07'40" | 123°22'05" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0679 | FS-3 (USGS Cenozoic locality M7463) | 46°07'40" | 123°22'05" | Pittsburg Bluff Formation | Eocene - late | Galvinian - late | --- | Murphy (1981) | |
| 0680 | Cave | 46°07'35" | 123°22'00" | Pittsburg Bluff Formation | Eocene - late | Galvinian | --- | Murphy (1981) | |
| 0681 | FS-4 (USGS Cenozoic locality M7464) | 46°07'20" | 123°22'10" | Pittsburg Bluff Formation | Eocene - late | Galvinian - late | --- | Murphy (1981) | |
| 0682 | FS-2 (USGS Cenozoic locality M7461) | 46°07'20" | 123°21'45" | Pittsburg Bluff Formation | Eocene - late | Galvinian - late | --- | Murphy (1981) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0670 | Nicolai Mtn. 7.5-min. | Clatsop | SE SE | 19 | 7 N | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0671 | Nicolai Mtn. 7.5-min. | Clatsop | SW SE | 15 | 7 N. | 6 W. | mollusks; Northrup Creek fm. of Niem and Niem (1985) |
| 0672 | Nicolai Mtn. 7.5-min. | Clatsop | SW SE | 15 | 7 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0673 | Cathlamet 7.5-min. | Clatsop | SE SE | 34 | 8 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0674 | Cathlamet 7.5-min. | Clatsop | SW SE | 35 | 8 N. | 6 W. | mollusks |
| 0675 | Cathlamet 7.5-min. | Clatsop | SW SE | 35 | 8 N. | 6 W. | diatoms; identified by John Barron (USGS); informal Big Creek member, Astoria Fm. of Murphy (1981) |
| 0676 | Cathlamet 7.5-min. | Clatsop | SE SE | 35 | 8 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0677 | Cathlamet 7.5-min. | Clatsop | SE SW | 36 | 8 N. | 6 W. | mollusks; identified by E. J. Moore (USGS); informal Oswald West mudstone of Murphy (1981) |
| 0678 | Nassa Point 7.5-min. | Clatsop | NW NE | 1 | 7 N. | 6 W. | mollusks |
| 0679 | Nassa Point 7.5-min. | Clatsop | NE | 1 | 7 N. | 6 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0680 | Nassa Point 7.5-min. | Clatsop | NE | 1 | 7 N. | 6 W. | mollusks; identified by E. J. Moore (USGS); assemblage is typical of Pittsburg Bluff Fm. |
| 0681 | Marshland 7.5-min. | Clatsop | SW NE | 1 | 7 N. | 6 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0682 | Marshland 7.5-min. | Columbia | SW NW | 6 | 7 N. | 5 W. | mollusks; identified by W. O. Addicott (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0683 | M9 (USNM 15587) | 46°06'40" | 123°17'15" | Pittsburg Bluff Formaton | Oligocene | --- | --- | Warren and others (1945) | |
| 0684 | M10 (USNM 15585) | 46°05'15" | 123°13'02" | Gries Ranch beds | Oligocene - early | --- | --- | Warren and others (1945) | |
| 0885 | M11 (USNM 15298) | 46°04'40" | 123°13'25" | Gries Ranch beds | Oligocene - early | --- | --- | Warren and others (1945) | |
| 0686 | PF9 | 46°07'47" | 122°53'40" | Cowlitz Formation | Eocene - late | --- | --- | Wilkinson and others (1946) | |
| 0687 | PF10 | 46°07'18" | 122°53'15" | Cowlitz Formation | Eocene - late | --- | -- | Wilkinson and others (1946) | Weaver (1942) |
| 0688 | 118-8 (USGS Cenozoic loc. M6418) | 46°03'55" | 123°50'25" | Astoria Formation | Miocene - early or middle | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0689 | 57-7 (USGS Cenozoic loc. M6426) | 46°03'57" | 123°48'52" | Astoria Fm., Cannon Beach Member | Oligocene - late or Miocene - early | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0690 | 58-7 (USGS Cenozoic loc. M6417) | 46°03'45" | 123°48'30" | Astoria Fm., Cannon Beach Member | Miocene - early or middle | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0691 | PMT 60-74 | 46°03'45" | 123°46'40" | Astoria Fm., Cannon Beach Member | Oligocene - late to Miocene early-middle | --- | --- | Tolson (1976) | see also Niem and Niem (1985) |
| 0692 | 4-7-74 | 46°03'57" | 123°43'45" | Smuggler Cove formation | Oligocene - late | Zemorrian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0693 | 267 | 46°02'57" | 123°43'02" | Smuggler Cove formation | Eocene - late | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0694 | 265 | 46°03'02" | 123°42'35" | Smuggler Cove formation | Eocene - late | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0695 | 130B | 46°04'00" | 123°41'25" | Astoria Fm., Wickiup Mountain Member | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0683 | Marshland 7.5-min. | Columbia | NW NE | 10 | 7 N. | 5 W. | mollusks |
| 0684 | Clatskanie 7.5-min. | Columbia | SE SE | 18 | 7 N. | 4 W. | mollusks |
| 0685 | Clatskanie 7.5-min. | Columbia | center | 19 | 7 N. | 4 W. | mollusks |
| 0686 | Kelso 7.5-min. | Cowlitz | SE | 35 | 8 N. | 2 W. | mollusks |
| 0687 | Rainier 7.5-min. | Cowlitz | NW | 1 | 7 N. | 2 W. | mollusks; type locality in Weaver (1942) |
| 0688 | Olney 7.5-min. | Clatsop | NE NE | 30 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Silver Point member, Astoria Fm. of Cooper (1981) |
| 0689 | Olney 7.5-min. | Clatsop | NW NW | 28 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Silver Point member, Astoria Fm. of Cooper (1981) |
| 0690 | Olney 7.5-min. | Clatsop | SW NW | 28 | 7 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Silver Point member, Astoria Fm. of Cooper (1981) |
| 0691 | Olney 7.5-min. | Clatsop | SE NE | 27 | 7 N. | 9 W. | Peterson (1984) recollected mollusks at this locality; recollected assemblage is Miocene; identified by E. J. Moore (USGS) |
| 0692 | Green Mountain 7.5-min. | Clatsop | NW NW | 30 | 7 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); indicate bathyal conditions; informal Oswald West mudstone of Cooper (1981) |
| 0693 | Green Mountain 7.5-min. | Clatsop | SE NE | 31 | 7 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS); indicate lower bathyal conditions; informal Oswald West mudstone of Peterson (1984) |
| 0694 | Green Mountain 7.5-min. | Clatsop | W 1/2 NW | 32 | 7 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS); indicate lower bathyal conditions; informal Oswald West mudstone of Peterson (1984) |
| 0695 | Green Mountain 7.5-min. | Clatsop | NW NW | 28 | 7 N. | 8 W. | mollusks; identified by E. J. Moore (USGS); informal Big Creek member, Astoria Fm. of Peterson (1984) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0696 | 128a | 46°03'40" | 123°40'30" | Astoria Fm., Wickiup Mountain Member | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0697 | 125 | 46°04'00" | 123°39'15" | Smuggler Cove formation | Oligocene - late or Miocene - early | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0698 | M5 | 46°04'00" | 123°34'45" | Astoria Formation | Miocene | --- | --- | Warren and others (1945) | |
| 0699 | D430 | 46°03'00" | 123°34'30" | Northrup Creek formation | Miocene | --- | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0700 | N84-141 | 46°02'20" | 123°34'35" | Northrup Creek formation | Oligocene to Miocene | --- | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0701 | K 84-9 | 46°03'10" | 123°27'00" | Northrup Creek formation | Oligocene? | --- | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0702 | K 84-8 | 46°03'00" | 123°27'02" | Northrup Creek formation | Oligocene | --- | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0703 | N84-74 | 46°03'30" | 123°26'35" | Northrup Creek formation | Miocene? | Pillarian? | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0704 | N 84-40 | 46°02'52" | 123°26'15" | Northrup Creek formation | Miocene? | --- | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0705 | N84-76 | 46°03'05" | 123°22'05" | Pittsburg Bluff Formation | Eocene - late | Galvinian | --- | A. R. Niem (unpub. data) | |
| 0706 | OC 106 | 46°02'35" | 123°21'25" | Pittsburg Bluff Formation | Oligocene | Matlockian | --- | Goalen (1988) | |
| 0707 | OC 70 | 46°02'25" | 123°24'02" | Pittsburg Bluff Formation | Oligocene | Matlockian? | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0708 | OC 62 | 46°02'25" | 123°22'15" | Pittsburg Bluff Formation | Oligocene | Matlockian? | --- | Goalen (1988) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0696 | Green Mountain 7.5-min. | Clatsop | NE SE | 28 | 7 N. | 8 W. | mollusks; identified by E. J. Moore (USGS); informal Big Creek member, Astoria Fm. of Peterson (1984) |
| 0697 | Green Mountain 7.5-min. | Clatsop | NE NE | 27 | 7 N. | 8 W. | mollusks; identified by E. J. Moore (USGS); informal Oswald West mudstone of Peterson (1984) |
| 0698 | Wickiup Mtn. 7.5-min. | Clatsop | NE NW | 29 | 7 N. | 7 W. | mollusks |
| 0699 | Wickiup Mtn. 7.5-min. | Clatsop | center NE | 32 | 7 N. | 7 W. | diatoms; identified by Jack Baldauf (USGS) |
| 0700 | Wickiup Mtn. 7.5-min. | Clatsop | NE NW | 5 | 6 N. | 7 W. | diatoms; identified by John Barron (USGS) |
| 0701 | Nicolai Mtn. 7.5-min. | Clatsop | NE NE | 32 | 7 N. | 6 W. | diatoms; identified by John Barron (USGS) |
| 0702 | Nicolai Mtn. 7.5-min. | Clatsop | SW NE | 32 | 7 N. | 6 W. | diatoms; identified by John Barron (USGS) |
| 0703 | Nicolai Mtn. 7.5-min. | Clatsop | SW SW | 28 | 7 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0704 | Nicolai Mtn. 7.5-min. | Clatsop | NE SW | 33 | 7 N. | 6 W. | coccoliths; identified by David Bukry (USGS); coccoliths are correlative with the Saucesian benthonic foraminiferal stage |
| 0705 | Marshland 7.5-min. | Clatsop | NE NE | 36 | 7 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0706 | Marshland 7.5-min. | Columbia | SE SW | 31 | 7 jN. | 5 W. | mollusks; identified by E. J. Moore (USGS) |
| 0707 | Nicolai Mtn. 7.5-min. | Clatsop | NE NE | 3 | 6 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0708 | Marshland 7.5-min. | Clatsop | NE NW | 1 | 6 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0709 | OC 55 | 46°02'25" | 123°21'58" | Pittsburg Bluff Formation | Oligocene | Matlockian? | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0710 | OC 64 | 46°01'45" | 123°22'45" | Pittsburg Bluff Formation | Oligocene | Matlockian | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0711 | JG 63 | 46°01'40" | 123°22'00" | Pittsburg Bluff Formation | Eocene - late | Narizian to Refugian | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0712 | M15 (USNM 15548) | 46°01'10" | 123°18'57" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | --- |
| 0713 | Peterson | 46°02'12" | 123°53'08" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | --- | Coccolith zone CN4 | Peterson (1984) | see also Niem and Niem (1985) |
| 0714 | PMT 14 | 45°59'22" | 123°53'45" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Tolson (1976) | see also Niem and Niem (1985) |
| 0715 | 11-7-74 | 45°59'05" | 123°53'43" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0716 | PMT 44 | 45°59'45" | 123°51'00" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Tolson (1976) | see also Niem and Niem (1985) |
| 0717 | PMT 36 | 45°59'40" | 123°50'00" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Saucesian to Relizian | --- | Tolson (1976) | see also Niem and Niem (1985) |
| 0718 | PMT 64 | 45°59'15" | 123°49'20" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Saucesian to Relizian | --- | Tolson (1976) | see also Niem and Niem (1985) |
| 0719 | PMT 38-74 | 45°59'20" | 123°47'57" | Astoria Fm., Wickiup Mountain Member | Miocene - middle | --- | --- | Tolson (1976) | see also Niem and Niem (1985) |
| 0720 | MC 9/11 | 45°59'35" | 123°46'40" | Astoria Fm., Wickiup Mountain Member | Miocene - early to middle | Pillarian to Newportian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0721 | PMT 12-74 | 45°59'15" | 123°46'05" | Astoria Fm., Wickiup Mountain Member | Miocene - middle | --- | --- | Tolson (1976) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0709 | Marshland 7.5-min. | Clatsop | NW NE | 1 | 6 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0710 | Nicolai Mtn. 7.5-min. | Clatsop | SE SE | 2 | 6 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0711 | Marshland 7.5-min. | Clatsop | SE SW | 1 | 6 N. | 6 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0712 | Marshland 7.5-min. | Columbia | center | 9 | 6 N. | 5 W. | mollusks |
| 0713 | Gearhart 7.5-min. | Clatsop | NE | 2 | 6 N. | 10 W. | coccoliths, age-definitive assemblage; identified by David Bukry (USGS); informal Silver Point member, Astoria Fm. of Peterson (1984). CN4 is correlative to early-middle Miocene (Bukry, 1981). |
| 0714 | Tillamook Head 7.5-min. | Clatsop | NW SW | 23 | 6 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); informal upper Silver Point member, Astoria Fm. of Tolson (1976) |
| 0715 | Tillamook Head 7.5-min. | Clatsop | SW SW | 23 | 6 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); indicate cold, deep water; informal Silver Point member, Astoria Fm. of Cooper (1981) |
| 0716 | Necanicum Junction 7.5-min. | Clatsop | NE NW | 19 | 6 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); (500 m or less water depths); informal upper Silver Point member, Astoria Fm. of Tolson (1976) |
| 0717 | Necanicum Junction 7.5-min. | Clatsop | center NW | 20 | 6 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); indicate bathyal conditions; informal Airplane unit within Astoria Fm. of Tolson (1976) |
| 0718 | Necanicum Junction 7.5-min. | Clatsop | center SE | 20 | 6 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); indicate bathyal conditions; informal Airplane unit within Astoria Fm. of Tolson (1976) |
| 0719 | Necanicum Junction 7.5-min. | Clatsop | NE SE | 21 | 6 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal "Angora Peak" sandstone, Astoria Fm. of Tolson (1976) |
| 0720 | Necanicum Junction 7.5-min. | Clatsop | NE NE | 22 | 6 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Cooper (1981) |
| 0721 | Necanicum Junction 7.5-min. | Clatsop | NE SW | 23 | 6 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal "Angora Peak" sandstone, Astoria Fm. of Tolson (1976) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0722 | CP-41A | 46°01'20" | 123°45'40" | Astoria Fm., Wickiup Mountain Member | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0723 | CP-42A | 46°00'45" | 123°46'10" | Astoria Fm., Wickiup Mountain Member | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0724 | MC 6/1 | 45°00'45" | 123°46'10" | Astoria Fm., Wickiup Mountain Member | Oligocene or Miocene | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0725 | 66 | 46°02'20" | 123°43'45" | Astoria Fm., Wickiup Mountain Member | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0726 | 11 | 45°57'20" | 123°49'25" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Saucesian to Relizian | --- | A. R. Niem (unpub. data) | |
| 0727 | PEP 16 | 45°57'35" | 123°46'10" | Astoria Fm., Cannon Beach Member | Miocene, probably | --- | --- | Penoyer (1977) | see also Niem and Niem (1985) |
| 0728 | N84-209 | 46°00'15" | 123°44'45" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Pillarian to Newportian | --- | A. R. Niem (unpub. data) | |
| 0729 | CP-208 | 46°00'25" | 123°44'15" | Astoria Fm., Wickiup Mountain Member | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0730 | N84-212 | 45°59'52" | 123°43'45" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | A. R. Niem (unpub. data) | |
| 0731 | N84-210 | 45°59'50" | 123°44'15" | Astoria Fm., Wickiup Mountain Member | Miocene - late-early and middle | Newportian | --- | A. R. Niem (unpub. data) | |
| 0732 | 42 | 45°59'20" | 123°42'45" | Smuggler Cove formation | Miocene - early and early-middle | Saucesian | --- | Penoyer (1977) | see also Niem and Niem (1985) |
| 0733 | 74 | 45°59'45" | 123°41'30" | Smuggler Cove formation | Oligocene | Refugian - middle to late | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0734 | 11 | 46°01'20" | 123°37'25" | Smuggler Cove formation | Eocene - late to Oligocene | Refugian to Zemorrian | --- | Peterson (1984) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0722 | Olney 7.5-min. | Clatsop | NE NE | 11 | 6 N. | 9 W. | mollusks; identified by E. J. Moore (USGS); informal Big Creek member, Astoria Fm. of Peterson (1984) |
| 0723 | Olney 7.5-min. | Clatsop | SW NE | 11 | 6 N. | 9 W. | mollusks; identified by E. J. Moore (USGS); informal Big Creek member, Astoria Fm. of Peterson (1984) |
| 0724 | Olney 7.5-min. | Clatsop | E 1/2 SW | 11 | 6 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Big Creek member, Astoria Fm. of Cooper (1981) |
| 0725 | Green Mountain 7.5-min. | Clatsop | NW NW | 6 | 6 N. | 8 W. | mollusks; identified by E. J. Moore (USGS); informal Big Creek member, Astoria Fm. of Peterson (1984) |
| 0726 | Necanicum Junction 7.5-min. | Clatsop | S 1/2 SE | 32 | 6 N. | 9 W. | foraminifers |
| 0727 | Necanicum Junction 7.5-min. | Clatsop | NE SW | 35 | 6 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Silver Point member, Astoria Fm. of Penoyer (1977) |
| 0728 | Green Mountain 7.5-min. | Clatsop | NE SW | 13 | 6 N. | 9 W. | mollusks; identified by E. J. Moore (USGS) |
| 0729 | Green Mountain 7.5-min. | Clatsop | S 1/2 NE | 13 | 6 N. | 9 W. | mollusks; identified by E. J. Moore (USGS); informal Big Creek member, Astoria Fm. of Peterson (1984) |
| 0730 | Saddle Mountain 7.5-min. | Clatsop | SW SW | 18 | 6 N. | 8 W. | foraminifers; identified by Daniel R. McKeel |
| 0731 | Saddle Mountain 7.5-min. | Clatsop | SESE | 13 | 6 N. | 9 W. | mollusks; identified by E. J. Moore (USGS) |
| 0732 | Saddle Mountain 7.5-min. | Clatsop | NE SE | 19 | 6 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); (possibly outer shelf) |
| 0733 | Saddle Mountain 7.5-min. | Clatsop | SE SE | 17 | 6 N. | 8 W. | foraminifers; identified by K. McDougall (USGS) indicate upper to middle bathyal (200 m to 2,000 m water depths); informal Oswald West mudstone of Peterson (1984) |
| 0734 | Wickiup Mtn. 7.5-min. | Clatsop | NW NW | 12 | 6 N. | 8 W. | foraminifers; identified by K. McDougall (USGS) indicate lower bathyal (> 1500 m water depths); informal Oswald West mudstone of Peterson (1984) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0735 | 15 | 46°01'20" | 123°37'25" | Astoria Fm., Cannon Beach Member | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0736 | N84-208 | 45°59'00" | 123°40'15" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0737 | 85 | 45°58'30" | 123°39'25" | Smuggler Cove formation | Oligocene | Zemorrian? | --- | Penoyer (1977) | see also Niem and Niem (1985) |
| 0738 | 115A | 45°59'40" | 123°38'45" | Smuggler Cove formation | Eocene - late | Refugian | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0739 | 101 | 45°59'15" | 123°38'20" | Northrup Creek formation | Eocene - late? | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0740 | M13 (USNM 15457) | 46°00'10" | 123°36'40" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0741 | SM-188 | 45°59'30" | 123°36'35" | Northrup Creek formation | Miocene | --- | --- | Peterson (1984) | see also Niem and Niem (1985) |
| 0742 | 38 (USGS Cenozoic loc. no. 19044) | 45°57'15" | 123°42'45" | Astoria Fm., Cannon Beach Member | Miocene | --- | --- | Moore (1963) | see also Niem and Niem (1985) |
| 0743 | M14 (USNM 15515) | 45°57'15" | 123°40'15" | Astoria Formation | Miocene | --- | --- | Warren and others (1945) | Moore (1963) |
| 0744 | S-46 | 45°58'05" | 123°38'30" | Smuggler Cove formation | Miocene - early | --- | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0745 | N84-72 | 45°57'30" | 123°38'05" | Northrup Creek formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0746 | 401 | 45°58'20" | 123°33'45" | Pittsburg Bluff Formation | Eocene to Oligocene | --- | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0747 | 346 | 45°59'10" | 123°32'06" | Pittsburg Bluff Formation | Eocene - Oligocene | --- | --- | Nelson (1985) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0735 | Wickiup Mtn. 7.5-min. | Clatsop | NW NW | 12 | 6 N. | 8 W. | mollusks; identified by E. J. Moore (USGS); informal Silver Point member, Astoria Fm. of Peterson (1984) |
| 0736 | Saddle Mountain 7.5-min. | Clatsop | SE SE | 21 | 6 N. | 8 W. | foraminifers; identified by Daniel R. McKeel |
| 0737 | Saddle Mountain 7.5-min. | Clatsop | SW NE | 27 | 6 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0738 | Saddle Mountain 7.5-min. | Clatsop | NW NW | 23 | 6 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS); informal Oswald West mudstone of Peterson (1984) |
| 0739 | Saddle Mountain 7.5-min. | Clatsop | NE SW | 23 | 6 N. | 8 W. | diatoms; identified by John Barron (USGS); informal Oswald West mudstone of Peterson (1984) |
| 0740 | Wickiup Mtn. 7.5-min. | Clatsop | SE NE | 13 | 6 N. | 8 W. | mollusks |
| 0741 | Vinemaple 7.5-min. | Clatsop | center NE | 24 | 6 N. | 8 W. | diatoms; identified by John Barron (USGS); informal Big Creek member, Astoria Fm. of Peterson (1984) |
| 0742 | Saddle Mountain 7.5-min. | Clatsop | SE SE | 31 | 6 N. | 8 W. | mollusks; undifferentiated Astoria Fm. in Moore (1963) |
| 0743 | Saddle Mountain 7.5-min. | Clatsop | SE SE | 33 | 6 N. | 8 W. | mollusks; undifferentiated Astoria Fm. in Warren and others (1945) |
| 0744 | Saddle Mountain 7.5-min. | Clatsop | SE SW | 26 | 6 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Cooper (1981) |
| 0745 | Saddle Mountain 7.5-min. | Clatsop | NW SE | 35 | 6 N. | 8 W. | foraminifers; identified by Daniel R. McKeel |
| 0746 | Vinemaple 7.5-min. | Clatsop | NW SW | 28 | 6 N. | 7 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |
| 0747 | Vinemaple 7.5-min. | Clatsop | NE SW | 22 | 6 N. | 7 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0748 | 337 | 45°59'35" | 123°32'05" | Pittsburg Bluff Formation | Eocene - Oligocene | --- | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0749 | 314 | 46°00'25" | 123°31'00" | Pittsburg Bluff Formation | Eocene - Miocene | --- | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0750 | 128-8 | 46°00'40" | 123°30'55" | Pittsburg Bluff Formation | Oligocene - late or Miocene - early | Juanian to Pillarian | --- | Cooper (1981) | see also Niem and Niem (1985) |
| 0751 | 713-16 | 46°00'25" | 123°30'08" | Pittsburg Bluff Formation | Eocene - late or Oligocene | --- | --- | Olbinski (1983) | see also Niem and Niem (1985) |
| 0752 | 713-11 | 46°00'10" | 123°30'05" | Pittsburg Bluff Formation | Eocene - late or Oligocene | --- | --- | Olbinski (1983) | see also Niem and Niem (1985) |
| 0753 | 1017-2 | 46°00'40" | 123°27'30" | Pittsburg Bluff Formation | Eocene - late | Galvinian | --- | Olbinski (1983) | see also Niem and Niem (1985) |
| 0754 | OC 10-7-5 | 46°01'20" | 123°26'15" | Pittsburg Bluff Formation | Oligocene | Matlockian | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0755 | OC 10-16-1 | 46°00'45" | 123°23'15" | Pittsburg Bluff Formation | Oligocene | Matlockian? | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0756 | 730-9-3 | 46°00'35" | 123°23'10" | Keasey Formation | Eocene - late | Galvinian | --- | Olbinski (1983) | see also Niem and Niem (1985) |
| 0757 | OC 36 | 46°01'10" | 123°22'30" | Keasey Formation | Eocene - late | Galvinian | --- | Goalen (1988) | see also Niem and Niem (1985) |
| 0758 | 730-7 | 46°00'37" | 123°22'45" | Pittsburg Bluff Formation | Eocene - Oligocene | --- | --- | Olbinski (1983) | see also Niem and Niem (1985) |
| 0759 | 730-6 | 46°00'35" | 123°22'20" | Pittsburg Bluff Formation | Oligocene | --- | --- | Olbinski (1983) | see also Niem and Niem (1985) |
| 0760 | 917-2 | 46°00'02" | 123°22'32" | Sager Creek formation | Eocene - late | Refugian | --- | Olbinski (1983) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0748 | Vinemaple 7.5-min. | Clatsop | NE NW | 22 | 6 N. | 7 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |
| 0749 | Wickiup Mtn. 7.5-min. | Clatsop | NE NW | 14 | 6 N. | 7 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |
| 0750 | Wickiup Mtn. 7.5-min. | Clatsop | E 1/2 SW | 11 | 6 N. | 7 W. | mollusks; identified by E. J. Moore (USGS) |
| 0751 | Wickiup Mtn. 7.5-min. | Clatsop | NW NW | 13 | 6 N. | 7 W. | mollusks; identified by E. J. Moore (USGS) |
| 0752 | Wickiup Mtn. 7.5-min. | Clatsop | SW NW | 13 | 6 N. | 7 W. | mollusks; identified by E. J. Moore (USGS) |
| 0753 | Nicolai Mtn. 7.5-min. | Clatsop | NE NE | 18 | 6 N. | 6 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |
| 0754 | Nicolai Mtn. 7.5-min. | Clatsop | SW NW | 9 | 6 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0755 | Nicolai Mtn. 7.5-min. | Clatsop | SW SE | 11 | 6 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0756 | Nicolai Mtn. 7.5-min. | Clatsop | NW NE | 14 | 6 N. | 6 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |
| 0757 | Border between Nicolai Mtn. and Marshland 7.5-min. | Clatsop | NW SW | 12 | 6 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0758 | Nicolai Mtn. 7.5-min. | Clatsop | NE NE | 14 | 6 N. | 6 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |
| 0759 | Marshland 7.5-min. | Clatsop | NW | 13 | 6 N. | 6 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS) |
| 0760 | Nicolai Mtn. 7.5-min. | Clatsop | SW SW | 13 | 6 N. | 6 W. | foraminifers; identified by W. W. Rau (WDGER); informal Vesper Church formation of Olbinski (1983) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0761 | --- | 45°57'55" | 123°25'30" | Sager Creek formation | Eocene - late | Narizian | --- | Newton and Van Atta (1976) | see also Niem and Niem (1985) |
| 0762 | 79-3 | 45°59'15" | 123°23'45" | Sager Creek formation | Eocene | --- | --- | Olbinski (1983) | |
| 0763 | --- | 45°58'50" | 123°22'55" | Sager Creek formation | Eocene - late | Refugian | --- | Newton and Van Atta (1976) | see also Niem and Niem (1985) |
| 0764 | N80-22 | 45°58'55" | 123°22'10" | Sager Creek formation | Eocene - late? | Narizian? | --- | Niem and Niem (1985 and unpub. data) | |
| 0765 | 96-2 | 45°58'58" | 123°21'40" | Sager Creek formation | Eocene - Oligocene | --- | NP19-NP21 | Olbinski (1983) | see also Niem and Niem (1985) |
| 0766 | M16 (USNM 15318) | 45°59'25" | 123°15'25" | Keasey Formation | Eocene- late or Oligocene - early | --- | --- | Warren and others (1945) | Moore and Vokes (1953) |
| 0767 | M17 (USNM 15299) | 45°59'30" | 123°02'15" | Beds of Blakeley age | Oligocene-Miocene | --- | --- | Warren and others (1945) | |
| 0768 | PF12 | 45°58'40" | 122°56'55" | Gries Ranch beds | Oligocene - early | --- | --- | Wilkinson and others (1946) | |
| 0769 | PF14 | 45°57'45" | 122°56'54" | Gries Ranch beds | Oligocene - early | --- | --- | Wilkinson and others (1946) | |
| 0770 | PF13 | 45°57'15" | 122°55'50" | Gries Ranch beds | Oligocene - early | --- | --- | Wilkinson and others (1946) | |
| 0771 | MR69-22A | 45°55'20" | 123°58'33" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Saucesian - late | --- | W. W. Rau (WDGER unpub. data) | see also Niem and Niem (1985) |
| 0772 | N 55 | 45°55'05" | 123°58'35" | Astoria Fm., Cannon Beach Member | Miocene - early | Saucesian | --- | Neel (1976) | see also Niem and Niem (1985) |
| 0773 | Ecola State Park - beach | 45°55'02" | 123°58'22" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Saucesian or Relizian | --- | Niem and others (1973) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0761 | Sager Creek 7.5-min. | Clatsop | center NE | 33 | 6 N. | 6 W. | foraminifers; Keasey Formation of Newton and Van Atta (1976) |
| 0762 | Sager Creek 7.5-min. | Clatsop | SW SW | 23 | 6 N. | 6 W. | coccoliths; identified by Richard Poore (USGS); informal Vesper Church formation of Olbinski (1983) |
| 0763 | Sager Creek 7.5-min. | Clatsop | NE NE | 26 | 6 N. | 6 W. | foraminifers; Keasey Formation of Newton and Van Atta (1976) |
| 0764 | Birkenfeld 7.5-min. | Clatsop | NE NW | 25 | 6 N. | 6 W. | foraminifers; identified by W. W. Rau (WDGER); outer shelf to bathyal |
| 0765 | Birkenfeld 7.5-min. | Clatsop | N 1/2 NE | 25 | 6 N. | 6 W. | coccoliths; identified by L. M. Bybell (USGS); correlative with the Refugian-Zemorrian benthonic foraminiferal stages; informal Vesper Church formation of Olbinski (1983). NP19-NP21 is correlative to late Eocene to early Oligocene (Bukry, 1981). |
| 0766 | Birkenfeld 7.5-min. | Columbia | NW SW | 24 | 6 N. | 5 W. | Tertiary crinoid = *Isocrinus oregonensis;* near Mist, Oregon |
| 0767 | Baker Point 7.5-min. | Columbia | SW NE | 22 | 6 N. | 3 W. | mollusks |
| 0768 | Trenholm 7.5-min. | Columbia | NE | 29 | 6 N. | 2 W. | mollusks |
| 0769 | Trenholm 7.5-min. | Columbia | E 1/2 | 32 | 6 N. | 2 W. | mollusks |
| 0770 | Trenholm 7.5-min. | Columbia | SE SE | 33 | 6 N. | 2 W. | mollusks |
| 0771 | Tillamook Head 7.5-min. | Clatsop | SW NW | 18 | 5 N. | 10 W. | foraminifers |
| 0772 | Tillamook Head 7.5-min. | Clatsop | NW SW | 18 | 5 N. | 10 W. | Ecola Point; foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Neel (1976) |
| 0773 | Tillamook Head 7.5-min. | Clatsop | SW NE | 18 | 5 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); outer neritic to upper bathyal (500 to 1,500 ft water depths); informal Silver Point member, Astoria Fm. of Niem and others (1973) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0774 | 2 | 45°55'10" | 123°58'00" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | A. R. Niem (unpub. data) | |
| 0775 | SR Sample 2 | 45°54'08" | 123°58'00" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | W. W. Rau (WDGER unpub. data) | see also Niem and Niem (1985) |
| 0776 | CB-Ecola | 45°54'25" | 123°57'12" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | A. R. Niem (unpub. data) | Niem and others (1973) |
| 0777 | N53 | 45°54'45" | 123°56'40" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Neel (1976) | see also Niem and Niem (1985) |
| 0778 | N62 | 45°53'07" | 123°53'00" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Neel (1976) | see also Niem and Niem (1985) |
| 0779 | N3 | 45°53'00" | 123°57'43" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Neel (1976) | see also Niem and Niem (1985) |
| 0780 | F-3 | 45°53'00" | 123°57'43" | Astoria Fm., Cannon Beach Member | Oligocene - late or Miocene - early | --- | --- | Neel (1976) | see also Niem and Niem (1985) |
| 0781 | N1 | 45°52'15" | 123°52'55" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Neel (1976) | |
| 0782 | N17 | 45°53'40" | 123°50'15" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Neel (1976) | |
| 0783 | N64 | 45°53'05" | 123°46'30" | Smuggler Cove formation | Oligocene | Zemorrian | --- | Neel (1976) | see also Niem and Niem (1985) |
| 0784 | R | 45°52'45" | 123°45'05" | Smuggler Cove formation | Eocene | Matlockian - probably | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0785 | R540 | 45°52'07" | 123°44'40" | Smuggler Cove formation | Eocene - late to Oligocene | --- | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0786 | R116 | 45°52'20" | 123°44'10" | Smuggler Cove formation | Eocene - late to Oligocene | --- | --- | Rarey (1986) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0774 | Tillamook Head 7.5-min. | Clatsop | SW NE | 18 | 5 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0775 | Tillamook Head 7.5-min. | Clatsop | NW NE | 19 | 5 N. | 10 W. | Chapman Point; foraminifers |
| 0776 | Tillamook Head 7.5-min. | Clatsop | center NW | 20 | 5 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0777 | Tillamook Head 7.5-min. | Clatsop | SE SE | 17 | 5 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Neel (1976) |
| 0778 | Tillamook Head 7.5-min. | Clatsop | SW SE | 30 | 5 N. | 10 W. | Haystack Rock; foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Neel (1976) |
| 0779 | Tillamook Head 7.5-min. | Clatsop | SE SE | 30 | 5 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Neel (1976) |
| 0780 | Tillamook Head 7.5-min. | Clatsop | SE SE | 30 | 5 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); informal Silver Point member, Astoria Fm. of Neel (1976) |
| 0781 | Arch Cape 7.5-min. | Clatsop | S 1/2 SE | 35 | 5 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Neel (1976) |
| 0782 | Necanicum Junction 7.5-min. | Clatsop | NE NE | 30 | 5 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Neel (1976) |
| 0783 | Necanicum Junction 7.5-min. | Clatsop | SE SE | 27 | 5 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); informal Oswald West mudstone of Neel (1976) |
| 0784 | Necanicum Junction 7.5-min. | Clatsop | NE NE | 35 | 5 N. | 9 W. | mollusks; identified by E. J. Moore (USGS) |
| 0785 | Hamlet 7.5-min. | Clatsop | SE SW | 36 | 5 N. | 9 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0786 | Hamlet 7.5-min. | Clatsop | NE SE | 36 | 5 N. | 9 W. | foraminifers; identified by K. A. McDougall (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0787 | MC 9/24 and PEP 36 | 45°54'55" | 123°46'02" | Smuggler Cove formation | Oligocene - late | --- | --- | Cooper (1981) | see also Penoyer (1977), Niem and Niem (1985) |
| 0788 | 57 | 45°54'10" | 123°45'10" | Smuggler Cove formation | Eocene - late to Oligocene | Refugian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0789 | PEP 57 | 45°55'05" | 123°43'40" | Smuggler Cove formation | Eocene - late to Oligocene | Refugian to Zemorrian | --- | Penoyer (1977) | see also Niem and Niem (1985) |
| 0790 | N84-261 | 45°54'52" | 123°43'20" | Smuggler Cove formation | Eocene - late | Refugian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0791 | PEP 55 | 45°55'20" | 123°42'45" | Smuggler Cove formation | Miocene | --- | --- | Penoyer (1977) | see also Niem and Niem (1985) |
| 0792 | N84-262 | 45°55'30" | 123°42'30" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0793 | N84-102 | 45°56'15" | 123°42'35" | Smuggler Cove formation | Eocene - late | Refugian | --- | A. R. Niem (unpub. data) | |
| 0794 | K84-27 | 45°56'55' | 123°42'20" | Astoria Fm., Wickiup Mountain Member | Miocene | Newportian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0795 | N84-70 | 45°56'45" | 123°40'20" | Astoria Fm., Wickiup Mountain Member | Miocene | Pillarian or Newportian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0796 | PEP 70 | 45°56'50" | 123°49'30" | Smuggler Cove formation | Oligocene - late or Miocene - early | --- | --- | Penoyer (1977) | see also Niem and Niem (1985) |
| 0797 | 424 | 45°56'50" | 123°37'27" | Pittsburg Bluff Formation | Oligocene | --- | CP-19b and NP-25 | Nelson (1985) | see also Niem and Niem (1985) |
| 0798 | N84-45 | 45°55'40" | 123°40'15" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0799 | 320 | 45°54'10" | 123°40'40" | Smuggler Cove fm. - lower | Eocene - late to Oligocene | Refugian | --- | Rarey (1986) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0787 | Necanicum Junction 7.5-min. | Clatsop | NW SW | 14 | 5 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Cooper (1981) |
| 0788 | Necanicum Junction 7.5-min. | Clatsop | NE SE | 23 | 5 N. | 9 W. | foraminifers; Necanicum Junction; identified by W. W. Rau (WDGER) |
| 0789 | Saddle Mountain 7.5-min. | Clatsop | SW NW | 18 | 5 N. | 8 W. | foraminifers; identified by W. W. Rau (WDGER); informal Oswald West mudstone of Penoyer (1977) |
| 0790 | Saddle Mountain 7.5-min. | Clatsop | NE SW | 18 | 5 N. | 8 W. | foraminifers; identified by Daniel R. McKeel |
| 0791 | Saddle Mountain 7.5-min. | Clatsop | NE NE | 18 | 5 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Penoyer (1977) |
| 0792 | Saddle Mountain 7.5-min. | Clatsop | SW SW | 8 | 5 N. | 8 W. | foraminifers; identified by Daniel R. McKeel; SW flank of Humbug Mountain |
| 0793 | Saddle Mountain 7.5-min. | Clatsop | NE NW | 7 | 5 N. | 8 W. | foraminifers; identified by Daniel R. McKeel; NW flank of Humbug Mountain |
| 0794 | Saddle Mountain 7.5-min. | Clatsop | center NW | 5 | 5 N. | 8 W. | mollusks; identified by E. J. Moore (USGS) |
| 0795 | Saddle Mountain 7.5-min. | Clatsop | center E 1/2 | 4 | 5 N. | 8 W. | mollusks; identified by E. J. Moore (USGS) |
| 0796 | Necanicum Junction 7.5-min. | Clatsop | SW NE | 3 | 5 N. | 8 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0797 | Vinemaple 7.5-min. | Clatsop | SW NW | 1 | 5 N. | 8 W. | coccoliths; identified by David Bukry (USGS); coccoliths are correlative with Zemorrian benthonic foraminiferal stage; CP19b is correlative to the late Oligocene (Bukry, 1981) |
| 0798 | Saddle Mountain 7.5-min. | Clatsop | SE SE | 9 | 5 N. | 8 W. | NE flank of Humbug Mountain; foraminifers; identified by Daniel R. McKeel |
| 0799 | Saddle Mountain 7.5-min. | Clatsop | center | 21 | 5 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0800 | 488 | 45°56'25" | 123°35'45" | Smuggler Cove formation | Eocene - late to Oligocene | Refugian - late | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0801 | 178 | 45°56'10" | 123°34'40" | Sager Creek formation | Eocene - late | --- | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0802 | 252 | 45°54'30" | 123°33'50" | Sager Creek formation | Eocene - late | Refugian - late | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0803 | FM20 (USNM 15256) | 45°53'55" | 123°32'30" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0804 | N83-45 | 45°52'05" | 123°36'30" | Keasey Fm., Jewell member | Eocene - late | Narizian - late | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0805 | N84-213 | 45°56'00" | 123°31'02" | Keasey Fm., Jewell member | Eocene - late | Refugian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0806 | 299 | 45°56'02" | 123°30'15" | Keasey Fm., Jewell member | Eocene - late | Refugian - early | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0807 | F19 | 45°56'10" | 123°29'30" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0808 | --- | 45°56'25" | 123°28'55" | Sager Creek formation | Eocene - late | Refugian | --- | Newton and Van Atta (1976) | see also Niem and Niem (1985) |
| 0809 | 291 | 45°55'15" | 123°29'10" | Keasey Fm., Jewell member | Eocene - late to Oligocene | --- | --- | Nelson (1985) | see also Niem and Niem (1985) |
| 0810 | --- | 45°54'05" | 123°26'35" | Hamlet formation | Eocene - middle to late | Narizian | --- | Newton and Van Atta (1976) | see also Niem and Niem (1985) |
| 0811 | 83-14-6 | 45°55'10" | 123°25'15" | Sager Creek formation | Eocene - late | Galvinian | --- | Olbinski (1983) | see also Niem and Niem (1985) |
| 0812 | --- | 45°54'15" | 123°24'10" | Hamlet formation | Eocene - middle to late | Narizian | --- | Newton and Van Atta (1976) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0800 | Vinemaple 7.5-min. | Clatsop | SW SE | 6 | 5 N. | 7 W. | foraminifers; identified by K. A. McDougall (USGS); informal Oswald West mudstone of Nelson (1985) |
| 0801 | Vinemaple 7.5-min. | Clatsop | NE NW | 8 | 5 N. | 7 W. | mollusks; identified by E. J. Moore and Daniel Fleming (USGS); mapped as Keasey Formation (informal Vesper Church member) by Nelson (1985) |
| 0802 | Vinemaple 7.5-min. | Clatsop | NW NW | 21 | 5 N. | 7 W. | foraminifers identified by K. A. McDougall (USGS); mapped as Keasey Formation (informal Vesper Church member) by Nelson (1985) |
| 0803 | Vinemaple 7.5-min. | Clatsop | SW SW | 22 | 5 N. | 7 W. | mollusks |
| 0804 | Elsie 7.5-min. | Clatsop | SW NE | 31 | 5 N. | 7 W. | Elsie, OR; foraminifers; identified by Daniel R. McKeel |
| 0805 | Vinemaple 7.5-min. | Clatsop | NW NW | 11 | 5 N. | 7 W. | Jewell, OR; foraminifers; identified by Daniel R. McKeel |
| 0806 | Vinemaple 7.5-min. | Clatsop | NE NE | 11 | 5 N. | 7 W. | Jewell, OR; foraminifers; identified by W. W. Rau (WDGER) |
| 0807 | Sager Creek 7.5-min. | Clatsop | NW NE | 12 | 5 N. | 7 W. | foraminifers |
| 0808 | Sager Creek 7.5-min. | Clatsop | SW SW | 6 | 5 N. | 6 W. | foraminifers; East of Jewell, OR; mapped as Keasey Formation by Newton and Van Atta (1976) |
| 0809 | Sager Creek 7.5-min. | Clatsop | NE NE | 13 | 5 N. | 7 W. | Nehalem River just south of Jewell; foraminifers; identified by K. McDougall (USGS) |
| 0810 | Sager Creek 7.5-min. | Clatsop | NE SE | 20 | 5 N. | 6 W. | foraminifers; mapped as Cowlitz Formation by Newton and Van Atta (1976) |
| 0811 | Sager Creek 7.5-min. | Clatsop | SE NE | 16 | 5 N. | 6 W. | mollusks; identified by E. J. Moore (USGS); informal Vesper Church formation of Olbinski (1983) |
| 0812 | Sager Creek 7.5-min. | Clatsop | SE NE | 22 | 5 N. | 6 W. | foraminifers; strata mapped as Cowlitz Fm. by Newton and Van Atta (1976) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0813 | 9-2-1 | 45°54'00" | 123°19'00" | Keasey Formation | Eocene - late | --- | --- | Berkman (1990) | |
| 0814 | --- | 45°54'00" | 123°19'00" | Keasey Formation | Eocene - late | --- | CP14 or CP15 | Berkman (1990) | |
| 0815 | M28 (USNM 15314) | 45°55'00" | 123°10'55" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | Moore and Vokes (1953) |
| 0816 | M27 (USNM 15583) | 45°55'25" | 123°08'15" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0817 | USGS Cenozoic loc. no. M3860 | 45°54'45" | 123°08'15" | Pittsburg Bluff Fm. - base | Oligocene - middle | --- | --- | Moore (1976) | |
| 0818 | M29 (USNM 15264) | 45°54'20" | 123°08'20" | Pittsburg Bluff Formation | Oligocene - middle | "Lincoln" | *Molopophorus gabbi* | Warren and others (1945) | |
| 0819 | 752 | 45°50'52" | 123°20'45" | Hamlet fm., Sunset Highway member | Eocene - middle to late | Narizian | --- | Berkman (1990) | |
| 0820 | 743 | 45°51'50" | 123°19'55" | Hamlet formation | Eocene - late | Narizian - late | --- | Berkman (1990) | |
| 0821a | M38 (USNM 15304) | 45°51'52" | 123°19'50" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0821b | KAM 1001-1003 A252 | 45°51'52" | 123°19'50" | Keasey Formation - basal Cowlitz Formation | Eocene - late | Narizian - late | *Bulimina schencki-Plectofrondicularia* cf. *P. jenkinsi* | McDougall (1975, 1979) and Shaw (1986) | |
| 0822 | M39 & 40 (USNM 15305 & 15303) | 45°51'52" | 123°19'45" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0823 | M25 & M26 (USNM 15307 & 15306) | 45°52'10" | 123°19'20" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0824 | 7-22-1 | 45°52'20" | 123°19'25" | Keasey Formation | Eocene - late | --- | --- | Berkman (1990) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0813 | Birkenfeld 7.5-min. | Columbia | E 1/2 SE | 20 | 5 N. | 5 W. | mollusks; identified by E. J. Moore (USGS) |
| 0814 | Birkenfeld 7.5-min. | Columbia | E 1/2 SE | 20 | 5 N. | 5 W. | coccoliths; identified by David Bukry (USGS); coccoliths are correlative to late Narizian to Refugian benthonic foraminiferal stages; CP14 or 15 is correlative to middle and late Eocene (Bukry and Snavely, 1988) |
| 0815 | Pittsburg 7.5-min. | Columbia | SW SW | 16 | 5 N. | 4 W. | Tertiary crinoid - *Isocrinus oregonensis* |
| 0816 | Pittsburg 7.5-min. | Columbia | NW NE | 14 | 5 N. | 4 W. | mollusks |
| 0817 | Pittsburg 7.5-min. | Columbia | SE | 14 | 5 N. | 3 W. | mollusks |
| 0818 | Pittsburg 7.5-min. | Columbia | NW NE | 23 | 5 N. | 4 W. | mollusks; Pittsburg Bluff type locality; "Lincoln" stage of Warren and others (1945) is equivalent to late Galvinian molluscan stage of Armentrout (1981) |
| 0819 | Birkenfeld 7.5-min. | Columbia | W 1/2 NE | 7 | 4 N. | 5 W. | foraminifers; identified by Daniel R. McKeel |
| 0820 | Clear Creek 7.5-min. | Columbia | NE NW | 5 | 4 N. | 5 W. | foraminifers; identified by Daniel R. McKeel (ARCO Oil and Gas Co.); also collected and studied by Shaw (1986) in his Rock Creek section |
| 0821a | Clear Creek 7.5-min. | Columbia | NE NW | 5 | 4 N. | 5 W. | mollusks |
| 0821b | Clear Creek 7.5-min. | Columbia | NE NW | 5 | 4 N. | 5 W. | foraminifers; samples KAM 1001-1003 collected and studied by K. A. McDougall (1975, 1979); sample A252 collected and studied by N. B. Shaw (1986) |
| 0822 | Clear Creek 7.5-min. | Columbia | NW NE | 5 | 4 N. | 5 W. | mollusks |
| 0823 | Clear Creek 7.5-min. | Columbia | SE | 32 | 5 N. | 5 W. | mollusks |
| 0824 | Clear Creek 7.5-min. | Columbia | NW SE | 32 | 5 N. | 5 W. | mollusks; identified by E. J. Moore (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0825 | 774 | 45°52'20" | 123°19'25" | Keasey Formation | Eocene - late | Narizian - latest to Refugian - early | --- | Berkman (1990) | |
| 0826 | 724 | 45°52'40" | 123°19'30" | Keasey Formation | Eocene - late | Narizian - latest to Refugian - early | --- | Berkman (1990) | |
| 0827 | --- | 45°52'40" | 123°19'30" | Keasey Formation | Eocene - late | --- | CP14 or CP15 | Berkman (1990) | |
| 0828 | FM24 (USNM 15308 & 15309) | 45°52'35" | 123°18'15" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0829 | M23 (USNM 15302) | 45°52'55" | 123°17'50" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0830 | M21 (USNM 15316) | 45°53'02" | 123°17'20" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0831 | FM22 (USNM 15335) | 45°53'00" | 123°16'15" | Keasey Formation | Eocene - late or Oligocene- early | --- | --- | Warren and others (1945) | |
| 0832 | 87-35 | 45°51'20" | 123°17'15" | Keasey Formation | Eocene - late | Narizian | --- | Farr (1989) | |
| 0833 | 64 | 45°49'10" | 123°55'45" | Astoria Fm., Cannon Beach Member | Miocene - early and early-middle | Saucesian | --- | Smith (1975) | see also Niem and Niem (1985) |
| 0834 | N84-311 | 45°48'15" | 123°55'55" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Saucesian to Relizian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0835 | N83-3 | 45°47'20" | 123°56'25" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0836 | mile 57.1 | 45°47'10" | 123°57'27" | Smuggler Cove formation | Oligocene - late or Miocene - early | Zemorrian or Saucesian | --- | Niem and others (1973) | see also Niem and Niem (1985) |
| 0837 | SR 30-B | 45°46'35" | 123°56'25" | Astoria Fm., Angora Peak Member | Miocene - early and early-middle | Saucesian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0825 | Clear Creek 7.5-min. | Columbia | NW SE | 32 | 5 N. | 5 W. | foraminifers; identified by Daniel R. McKeel |
| 0826 | Birkenfeld 7.5-min. | Columbia | SW NE | 32 | 5 N. | 5 W. | foraminifers; identified by Daniel R. McKeel |
| 0827 | Birkenfeld 7.5-min. | Columbia | SW NE | 32 | 5 N. | 5 W. | coccoliths; identified by David Bukry (USGS); coccoliths are correlative with late Narizian to Refugian benthonic foraminiferal stages; CP14 or 15 is correlative to middle and late Eocene (Bukry and Snavely, 1988) |
| 0828 | Birkenfeld 7.5-min. | Columbia | center | 33 | 5 N. | 5 W. | mollusks and foraminifers |
| 0829 | Birkenfeld 7.5-min. | Columbia | NW NW | 34 | 5 N. | 5 W. | mollusks |
| 0830 | Birkenfeld 7.5-min. | Columbia | SE SW | 27 | 5 N. | 5 W. | mollusks |
| 0831 | Birkenfeld 7.5-min. | Columbia | SW | 26 | 5 N. | 5 W. | mollusks and foraminifers |
| 0832 | Clear Creek 7.5-min. | Columbia | center S 1/2 | 3 | 4 N. | 5 W. | foraminifers; identified by R. R. Schmidt (ARCO Oil and Gas Co.) |
| 0833 | Arch Cape 7.5-min. | Clatsop | NW SE | 20 | 4 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); informal Silver Point member, Astoria Fm. of Smith (1975) |
| 0834 | Arch Cape 7.5-min. | Clatsop | NW SE | 29 | 4 N. | 10 W. | Arch Cape Creek; foraminifers; identified by Daniel R. McKeel |
| 0835 | Arch Cape 7.5-min. | Clatsop | NW SW | 32 | 4 N. | 10 W. | foraminifers; identified by Daniel R. McKeel |
| 0836 | Arch Cape 7.5-min. | Clatsop | SE SW | 31 | 4 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); informal Oswald West mudstone of Niem and others (1973) |
| 0837 | Arch Cape 7.5-min. | Tillamook | N 1/2 SW | 5 | 3 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); cool to cold water; upper bathyal (150 to 500 m water depths) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0838 | USGS Cenozoic locality 5816 | 45°46'30" | 123°58'25" | Cape Falcon conglomerate | Miocene - middle | --- | --- | Cressy (1974) | see also Niem and Niem (1985) |
| 0839 | M65, M66, M67 (USNM 15257, 8, 9) | 45°45'55" | 123°58'02" | Beds of Blakeley age (Smuggler Cove fm.) | Oligocene - Miocene | --- | --- | Warren and others (1945) | |
| 0840 | Oswald West State Park | 45°45'45" | 123°57'58" | Smuggler Cove formation | Oligocene | Zemorrian | --- | Cressy (1974) | see also Niem and Niem (1985) |
| 0841 | OW5I-37 (USGS Cenozoic locality M5805) | 45°45'45" | 123°57'58" | Smuggler Cove formation | Oligocene - late or Miocene - early | Matlockian - Juanian | --- | Cressy (1974) | |
| 0842 | OW51-39B (USGS Cenozoic locality M5806) | 45°45'30" | 123°57'45" | Smuggler Cove formation | Oligocene | Zemorrian | --- | Cressy (1974) | see also Niem and Niem (1985) |
| 0843 | M68 (USNM 15260) | 45°45'40" | 123°57'10" | Beds of Blakeley age (Smuggler Cove fm.) | Oligocene - Miocene | --- | --- | Warren and others (1945) | |
| 0844 | SR62-60 | 45°45'40" | 123°55'15" | Astoria Fm., Cannon Beach Member | Miocene - early to middle | Saucesian to Relizian | --- | W. W. Rau (WDGER unpub. data) | see also Niem and Niem (1985) |
| 0845 | FC-19 (USGS Cenozoic locality M5807) | 45°46'32" | 123°54'30" | Astoria Fm., Angora Peak Member | Miocene - middle | Newportian | --- | Cressy (1974) | see also Niem and Niem (1985) |
| 0846 | WC 53-22 | 45°46'45" | 123°53'20" | Astoria Fm., Angora Peak Member | Miocene | --- | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0847 | N84-321 | 45°47'07" | 123°51'00" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0848 | WC-53-22 (USGS Cenozoic locality M5808) | 45°46'30" | 123°53'10" | Astoria Fm., Angora Peak Member | Miocene - middle | Newportian(?) | --- | Cressy (1974) | see also Niem and Niem (1985) |
| 0849 | SS-18A (USGS Cenozoic loc. no. M5803) | 45°46'10" | 123°53'40" | Astoria Fm., Angora Peak Member | Miocene - early | Pillarian(?) | --- | Cressy (1974) | see also Niem and Niem (1985) |
| 0850 | WC-41A (USGS Cenozoic locality M5802) | 45°45'30" | 123°52'58" | Astoria Fm., Angora Peak Member | Miocene - middle to late | --- | --- | Cressy (1974) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0838 | Arch Cape 7.5-min. | Tillamook | center | 1 | 3 N. | 11 W. | mollusks; identified by W. O. Addicott (USGS); *Vertipecten fucanus;* inner sublittoral (neritic) zone; 30 to 120 ft water depths; Cressy (1974) mapped this unit as Angora Peak member of the Astoria Fm. |
| 0839 | Arch Cape 7.5-min. | Tillamook | E 1/2 | 12 | 3 N. | 11 W. | mollusks |
| 0840 | Arch Cape 7.5-min. | Tillamook | W 1/2 | 7 | 3 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); bathyal (>150 m water depths); informal Oswald West mudstone of Cressy (1974) |
| 0841 | Arch Cape 7.5-min. | Tillamook | W 1/2 | 7 | 3 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); "Blakeley" stage in older literature is equivalent to Matlockian or Juanian molluscan stage of Armentrout (1981); informal Oswald West mudstone of Cressy (1974) |
| 0842 | Arch Cape 7.5-min. | Tillamook | SW | 7 | 3 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER), many deep, cold-water forms; bathyal (>150 m water depths); informal Oswald West mudstone of Cressy (1974) |
| 0843 | Arch Cape 7.5-min. | Tillamook | center | 7 | 3 N. | 10 W. | mollusks |
| 0844 | Arch Cape 7.5-min. | Tillamook | SW NW | 9 | 3 N. | 10 W. | foraminifers; north side of Rock Mountain |
| 0845 | Arch Cape 7.5-min. | Tillamook | SE NE | 4 | 3 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); assemblage includes *Mytilus middendorffi* |
| 0846 | Arch Cape 7.5-min. | Tillamook | NE | 3 | 3 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0847 | Soapstone Lake 7.5-min. | Clatsop | SW SE | 36 | 4 N. | 10 W. | foraminifers; identified by Daniel R. McKeel |
| 0848 | Arch Cape 7.5-min. | Tillamook | SE NE | 3 | 3 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS); includes *Vertipecten fucanus* |
| 0849 | Arch Cape 7.5-min. | Tillamook | SW SE | 3 | 3 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0850 | Arch Cape 7.5-min. | Tillamook | NW SW | 11 | 3 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0851 | W82-6 | 45°44'00" | 123°52'35" | Smuggler Cove formation | Oligocene | Zemorrian | --- | R. E. Wells (USGS unpub. mapping) | |
| 0852 | W82-2F | 45°42'47" | 123°53'31" | Smuggler Cove formation | Oligocene | Zemorrian | --- | R. E. Wells (USGS, unpubl. mapping) | |
| 0853 | W82-19F | 45°41'52.5" | 123°52'27" | "Nestucca" Formation | Eocene - late | Narizian - late | --- | R. E. Wells (USGS, unpub. mapping) | |
| 0854 | M69 (USNM 15612) | 45°42'12" | 123°50'20" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0855 | N83-41 | 45°51'30" | 123°52'30" | Interbeds with Grande Ronde breccias | Miocene - early to middle | Saucesian to Relizian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0856 | N83-57 | 45°50'45" | 123°48'45" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0857 | R | 45°50'47" | 123°47'35" | Smuggler Cove formation | Eocene - late | Refugian | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0858 | TS 26 | 45°49'45" | 123°47'15" | Smuggler Cove formation | Oligocene - late and Miocene - early | --- | --- | Smith (1975) | see also Niem and Niem (1985) |
| 0859 | N84-272 | 45°48'40" | 123°46'35" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0860 | R528 | 45°48'40" | 123°44'20" | Smuggler Cove formation | Oligocene | Refugian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0861 | R535 | 45°48'30" | 123°43'30" | Keasey Fm., Jewell member | Eocene - late | Refugian | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0862 | 659 | 45°51'25" | 123°42'30" | Hamlet formation | Eocene - late | Refugian | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0863 | 564 | 45°49'10" | 123°41'15" | Hamlet formation | Eocene - late | Narizian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0851 | Nehalem 7.5-min. | Tillamook | NW | 23 | 3 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER); outer shelf to upper bathyal (100 to 500 m water depths) |
| 0852 | Nehalem 7.5-min. | Tillamook | SW SE | 27 | 3 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0853 | Foley Peak 7.5-min. | Tillamook | SE SW | 35 | 3 N. | 10 W. | foraminifers |
| 0854 | Foley Peak 7.5-min. | Tillamook | SW NW | 31 | 3 N. | 9 W. | mollusk |
| 0855 | Border between Arch Cape and Soapstone Lake 15-min. | Clatsop | E 1/2 SW | 2 | 4 N. | 10 W. | foraminifers; identified by Daniel R. McKeel |
| 0856 | Soapstone Lake 7.5-min. | Clatsop | NE SW | 8 | 4 N. | 9 W. | South side of Kidders Butte; foraminifers; identified by Daniel R. McKeel |
| 0857 | Soapstone Lake 7.5-min. | Clatsop | NE SW | 9 | 4 N. | 9 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0858 | Soapstone Lake 7.5-min. | Clatsop | center SE | 16 | 4 N. | 9 W. | mollusks; identified by W. O. Addicott (USGS); informal Oswald West mudstone of Smith (1975) |
| 0859 | Soapstone Lake 7.5-min. | Clatsop | NW NW | 27 | 4 N. | 9 W. | foraminifers; identified by Daniel R. McKeel |
| 0860 | Hamlet 7.5-min. | Clatsop | NE NE | 26 | 4 N. | 9 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0861 | Hamlet 7.5-min. | Clatsop | N 1/2 NE | 25 | 4 N. | 9 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0862 | Hamlet 7.5-min. | Clatsop | N 1/2 SE | 6 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0863 | Hamlet 7.5-min. | Clatsop | SE SE | 17 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0864 | 562 | 45°49'10" | 123°41'15" | Hamlet formation | Eocene - late-middle to Oligocene - early | --- | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0865 | 557 | 45°49'08" | 123°41'25" | Hamlet formation | Eocene - late | Narizian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0866 | 558 | 45°49'08" | 123°41'25" | Hamlet formation | Eocene - middle to Oligocene | --- | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0867 | 548 | 45°48'30" | 123°42'10" | Hamlet formation | Eocene - late | Narizian - late to Refugian - early | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0868 | 612 | 45°48'32" | 123°41'45" | Hamlet formation | Eocene - late | Narizian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0869 | 612 | 45°48'32" | 123°41'45" | Hamlet formation | Eocene - late-middle | --- | CP 14a | Rarey (1986) | see also Niem and Niem (1985) |
| 0870 | 615 | 45°48'20" | 123°41'30" | Hamlet formation | Eocene - late | Narizian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0871 | 620 | 45°47'55" | 123°41'05" | Hamlet formation | Eocene | --- | CP 14a | Rarey (1986) | see also Niem and Niem (1985) |
| 0872 | 621 | 45°47'52" | 123°41'00" | Hamlet formation | Eocene - late | Narizian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0873 | 628 | 45°47'35" | 123°40'45" | Hamlet formation | Eocene - late | Narizian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0874 | 629 | 45°47'30" | 123°40'30" | Hamlet formation | Eocene - late | Narizian - late | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 0875 | N84-240 | 45°52'35" | 123°35'00" | Keasey Fm., Jewell member | Eocene - late | Refugian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 0876 | 254 | 45°52'35" | 123°35'00" | Keasey Fm., Jewell member | Eocene - late | Refugian - early | --- | Nelson (1985) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0864 | Hamlet 7.5-min. | Clatsop | SE SE | 17 | 4 N. | 8 W. | coccoliths; identified by David Bukry (USGS) |
| 0865 | Hamlet 7.5-min. | Clatsop | SW SE | 17 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0866 | Hamlet 7.5-min. | Clatsop | SW SE | 17 | 4 N. | 8 W. | diatoms; identified by John Barron (USGS) |
| 0867 | Hamlet 7.5-min. | Clatsop | NE SE | 19 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0868 | Hamlet 7.5-min. | Clatsop | NE SW | 20 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0869 | Hamlet 7.5-min. | Clatsop | NE SW | 20 | 4 N. | 8 W. | coccoliths; identified by David Bukry (USGS); CP14a is correlative to the late-middle Eocene (Bukry and Snavely, 1988) |
| 0870 | Hamlet 7.5-min. | Clatsop | SE SW | 20 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0871 | Hamlet 7.5-min. | Clatsop | NE NE | 29 | 4 N. | 8 W. | coccoliths; identified by David Bukry (USGS); CP14a is correlative to the late-middle Eocene (Bukry and Snavely, 1988) |
| 0872 | Hamlet 7.5-min. | Clatsop | SE NE | 29 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0873 | Hamlet 7.5-min. | Clatsop | NW SW | 28 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0874 | Hamlet 7.5-min. | Clatsop | SE SW | 28 | 4 N. | 8 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0875 | Vinemaple 7.5-min. | Clatsop | W 1/2 NW | 5 | 4 N. | 7 W. | foraminifers; identified by Daniel R. McKeel |
| 0876 | Vinemaple 7.5-min. | Clatsop | W 1/2 NW | 5 | 4 N. | 7 W. | foraminifers; identified by K. A. McDougall (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0877 | 74-4-13 | 45°52'35" | 123°35'00" | Keasey Fm., Jewell member | Eocene - late-middle to Oligocene - early | --- | --- | Mumford (1988) | see also Niem and Niem (1985) |
| 0878 | 829-2-2 | 45°50'35" | 123°33'40" | Hamlet formation | Eocene - late-middle to Eocene - late | --- | --- | Mumford (1988) | |
| 0879 | 627-2-10 | 45°51'15" | 123°32'57" | Hamlet formation | Eocene - late | Refugian | --- | Mumford (1988) | |
| 0880 | FM32 (USNM 15253) | 45°51'40" | 123°33'10" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0881 | M33 (USNM 15255) | 45°51'32" | 123°33'00" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0882 | 717-1-1 | 45°51'15" | 123°32'15" | Hamlet formation | Eocene - late | Narizian - late | --- | Mumford (1988) | |
| 0883 | 717-1-1 | 45°51'15" | 123°32'15" | Hamlet formation | Eocene - late-middle to Eocene - late | --- | --- | Mumford (1988) | |
| 0884 | F34 | 45°51'10" | 123°32'00" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0885 | 716-9-2 | 45°51'00" | 123°32'00" | Hamlet fm., Sunset Highway member | Eocene - late | Narizian - late | --- | Mumford (1988) | see also Niem and Niem (1985) |
| 0886 | 716-9-4 | 45°51'00" | 123°32'00" | Hamlet fm., Sunset Highway member | Eocene - late-middle to Eocene - late | --- | --- | Mumford (1988) | see also Niem and Niem (1985) |
| 0887 | 371-1-5 | 45°51'00" | 123°32'00" | Hamlet fm., Sunset Highway member | Eocene - middle to late | Narizian - middle to late | --- | Mumford (1988) | see also Niem and Niem (1985) |
| 0888 | 371-1-6 | 45°51'00" | 123°32'00" | Hamlet fm., Sunset Highway member | Eocene - middle to Oligocene - early | --- | --- | Mumford (1988) | see also Niem and Niem (1985) |
| 0889 | M35 (USNM 15254) | 45°50'42" | 123°31'25" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0877 | Vinemaple 7.5-min. | Clatsop | W 1/2 NW | 5 | 4 N. | 7 W. | coccoliths; identified by David Bukry (USGS) |
| 0878 | Elsie 7.5-min. | Clatsop | center NW | 9 | 4 N. | 7 W. | coccoliths; identified by David Bukry (USGS) |
| 0879 | Elsie 7.5-min. | Clatsop | NE SE | 4 | 4 N. | 7 W. | Jewell Junction; this fauna looks like Gries Ranch fauna; mollusks; identified by E. J. Moore (USGS) |
| 0880 | Elsie 7.5-min. | Clatsop | NE NW | 4 | 4 N. | 7 W. | mollusks and foraminifers |
| 0881 | Elsie 7.5-min. | Clatsop | SE NE | 4 | 4 N. | 7 W. | mollusks |
| 0882 | Elsie 7.5-min. | Clatsop | NE SW | 3 | 4 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER); good assemblage |
| 0883 | Elsie 7.5-min. | Clatsop | NE SW | 3 | 4 N. | 7 W. | coccoliths; identified by David Bukry (USGS) |
| 0884 | Elsie 7.5-min. | Clatsop | center S 1/2 | 3 | 4 N. | 7 W. | foraminifers |
| 0885 | Elsie 7.5-min. | Clatsop | S 1/2 SE | 3 | 7 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER); good assemblage |
| 0886 | Elsie 7.5-min. | Clatsop | S 1/2 SE | 3 | 4 N. | 7 W. | coccoliths; identified by David Bukry (USGS) |
| 0887 | Elsie 7.5-min. | Clatsop | S 1/2 SE | 3 | 4 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0888 | Elsie 7.5-min. | Clatsop | S 1/2 SE | 3 | 4 N. | 7 W. | coccoliths; identified by David Bukry (USGS) |
| 0889 | Elsie 7.5-min. | Clatsop | NW NW | 11 | 4 N. | 7 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0890 | 14 | 45°50'40" | 123°31'15" | Hamlet fm., Sunset Highway member | Eocene | --- | --- | Safley (1989) | see also Niem and Niem (1985) |
| 0891 | 37 | 45°50'30" | 123°28'55" | Hamlet fm., Roy Creek member | Eocene - middle | --- | --- | Safley (1989) | see also Niem and Niem (1985) |
| 0892 | 4220-1-3 | 45°49'15" | 123°34'10" | Keasey Fm., Jewell member | Eocene - late | Narizian - upper | --- | Mumford (1988) | see also Niem and Niem (1985) |
| 0893 | 4220-1-3 | 45°49'15" | 123°34'10" | Keasey Fm., Jewell member | Eocene - late-middle to Oligocene | --- | --- | Mumford (1988) | see also Niem and Niem (1985) |
| 0894 | M36 (USNM 15541) | 45°47'50" | 123°33'25" | Cowlitz Formation | Eocene - upper | --- | --- | Warren and others (1945) | |
| 0895 | 29 | 45°48'52" | 123°29'15" | Hamlet formation | Eocene - late | Narizian to Refugian | --- | Safley (1989) | see also Niem and Niem (1985) |
| 0896 | M37 (USNM 15336) | 45°47'36" | 123°27'14" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0897 | 31 | 45°47'35" | 123°27'15" | Hamlet fm., Roy Creek member | Eocene - middle | --- | --- | Safley (1989) | see also Niem and Niem (1985) |
| 0898 | 281 | 45°47'45" | 123°24'40" | Hamlet formation | Eocene - late | Narizian to Refugian | --- | Safley (1989) | see also Niem and Niem (1985) |
| 0899 | 302 | 45°47'40" | 123°23'30" | Hamlet formation | Eocene - late | Narizian to Refugian | --- | Safley (1989) | see also Niem and Niem (1985) |
| 0900 | M71 (USNM 15262) | 45°46'40" | 123°25'00" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0901 | M70 (USNM 15511) | 45°46'35" | 123°23'50" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0902 | 306 | 45°46'55" | 123°22'02" | Hamlet formation | Eocene - middle | --- | --- | Safley (1989) | see also Niem and Niem (1985) |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0890 | Elsie 7.5-min. | Clatsop | center NW | 11 | 4 N. | 7 W. | mollusks; identified by E. J. Moore (USGS); type section of Sunset Highway member |
| 0891 | Sunset Spring 7.5-min. | Clatsop | W 1/2 SW | 7 | 4 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0892 | Elsie 7.5-min. | Clatsop | SW SE | 17 | 4 N. | 7 W. | Spruce Run Lake; foraminifers; identified by W. W. Rau (WDGER) |
| 0893 | Elsie 7.5-min. | Clatsop | SW SE | 17 | 4 N. | 7 W. | coccoliths; identified by David Bukry (USGS) |
| 0894 | Elsie 7.5-min. | Clatsop | SE NW | 28 | 4 N. | 7 W. | mollusks |
| 0895 | Sunset Spring 7.5-min. | Clatsop | center NE | 24 | 4 N. | 7 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 0896 | Sunset Spring 7.5-min. | Clatsop | NE NW | 32 | 4 N. | 6 W. | mollusks |
| 0897 | Sunset Spring 7.5-min. | Clatsop | NE NW | 32 | 4 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0898 | Sunset Spring 7.5-min. | Clatsop | SE SW | 27 | 4 N. | 6 W. | foraminifers |
| 0899 | Sunset Spring 7.5-min. | Clatsop | SE SW | 26 | 4 N. | 6 W. | foraminifers |
| 0900 | Sunset Spring 7.5-min. | Tillamook | NW NW | 3 | 3 N. | 6 W. | mollusks |
| 0901 | Sunset Spring 7.5-min. | Tillamook | NW NW | 2 | 3 N. | 6 W. | mollusks |
| 0902 | Clear Creek 7.5-min. | Clatsop | SW SE | 36 | 4 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0903 | 9-6-1 | 45°46'20" | 123°22'10" | Cowlitz Formation | Eocene - late | Narizian - late | --- | Jackson (1983) | |
| 0904 | 8-25-10 | 45°46'28" | 123°20'50" | Cowlitz Formation | Eocene - late | Narizian - late | --- | Jackson (1983) | |
| 0905 | 9-13-1 | 45°46'37" | 123°20'05" | Cowlitz Formation | Eocene - late | Narizian - late | --- | Jackson (1983) | |
| 0906 | 7-11-1 | 45°49'45" | 123°18'55" | Hamlet fm., Sunset Highway member | Eocene - late | --- | --- | Berkman (1990) | |
| 0907 | 87-F11 (loc. 36) | 45°49'45" | 123°17'20" | Keasey Formation | Eocene | --- | --- | Farr (1989) | |
| 0908 | 780 | 45°48'10" | 123°18'45" | Cowlitz Formation | Eocene - late | Narizian | --- | Berkman (1990) | |
| 0909 | M49 (USNM 15549) | 45°48'25" | 123°17'00" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0910 | F41 & 42 | 45°51'10" | 123°14'55" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0911 | F43 | 45°50'07" | 123°15'18" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0912 | F45 | 45°49'50" | 123°15'05" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0913 | M44 (USNM 15456) | 45°49'40" | 123°16'10" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0914 | M46, M47, FM48 (USNM 15497, 15547, 15551) | 45°49'05" | 123°16'40" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0915 | 88-43 | 45°48'50" | 123°15'30" | Keasey Formation | Eocene - late to Oligocene | Refugian | --- | Farr (1989) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0903 | Clear Creek 7.5-min. | Tillamook | NW SE | 1 | 3 N. | 6 W. | foraminifers; identified by Daniel R. McKeel |
| 0904 | Clear Creek 7.5-min. | Washington | SW NE | 6 | 3 N. | 5 W. | foraminifers; identified by Daniel R. McKeel |
| 0905 | Clear Creek 7.5-min. | Washington | NW NW | 5 | 3 N. | 5 W. | foraminifers; identified by Daniel R. McKeel |
| 0906 | Clear Creek 7.5-min. | Columbia | N 1/2 SW | 16 | 4 N. | 5 W. | mollusks; identified by E. J. Moore (USGS) |
| 0907 | Clear Creek 7.5-min. | Columbia | SE NW | 15 | 4 N. | 5 W. | mollusks |
| 0908 | Clear Creek 7.5-min. | Columbia | SE NW | 28 | 4 N. | 5 W. | foraminifers; identified by Daniel R. McKeel |
| 0909 | Clear Creek 7.5-min. | Columbia | NE NE | 27 | 4 N. | 5 W. | mollusks |
| 0910 | Vernonia 7.5-min. | Columbia | SE SW | 1 | 4 N. | 5 W. | foraminifers |
| 0911 | Clear Creek 7.5-min. | Columbia | NW NW | 13 | 4 N. | 5 W. | foraminifers |
| 0912 | Clear Creek 7.5-min. | Columbia | NW SW | 13 | 4 N. | 5 W. | foraminifers |
| 0913 | Clear Creek 7.5-min. | Columbia | NE SW | 14 | 4 N. | 5 W. | mollusks |
| 0914 | Clear Creek 7.5-min. | Columbia | SW NW | 23 | 4 N. | 5 W. | mollusks and foraminifers |
| 0915 | Clear Creek 7.5-min. | Columbia | NW SW | 24 | 4 N. | 5 W. | foraminifers; identified by R. R. Schmidt (ARCO Oil and Gas Co.) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0916 | F50 | 45°47'55" | 123°16'25" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0917 | M51 (USNM 15265) | 45°47'10" | 123°16'30" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0918 | F73 | 45°46'30" | 123°17'00" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0919 | F74, FM75, FM76 (USNM --, 15453, 15296) | 45°46'07" | 123°16'50" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0920 | M77 (USNM 15584) | 45°45'45" | 123°17'55" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0921 | F79, F80 | 45°45'47" | 123°17'10" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0922 | M78 (USNM 15263) | 45°45'40" | 123°18'22" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0923 | F81, F82, FM83, F84 (USNM --,--,15266, --) | 45°45'30" | 123°17'50" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0924a | M85, M86, M87 (USNM 15533, 15520, 15297) | 45°45'10" | 123°17'40" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0924b | A259-265 | 45°45'10" | 123°17'40" | Cowlitz Formation | Eocene - late | Narizian | *Plectofrondicularia* cf. *P. jenkinsi* | Shaw (1986) | |
| 0925 | M91, M93 (USNM 15510, 15509) | 45°44'45" | 123°17'32" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0926 | F96 | 45°44'02" | 123°17'26" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0927 | W87-42F | 45°43'26" | 123°17'10" | Cowlitz Formation | Eocene - late | Narizian - latest | --- | R. E. Wells (USGS, unpub. mapping) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0916 | Clear Creek 7.5-min. | Columbia | SW SW | 26 | 4 N. | 5 W. | foraminifers |
| 0917 | Clear Creek 7.5-min. | Columbia | NW SW | 35 | 4 N. | 5 W. | mollusks |
| 0918 | Clear Creek 7.5-min. | Washington | center NE | 3 | 3 N. | 5 W. | foraminifers |
| 0919 | Clear Creek 7.5-min. | Washington | SE | 3 | 3 N. | 5 W. | mollusks and foraminifers |
| 0920 | Clear Creek 7.5-min. | Washington | NE NE | 9 | 3 N. | 5 W. | mollusks |
| 0921 | Clear Creek 7.5-min. | Washington | NW NE | 10 | 3 N. | 5 W. | foraminifers |
| 0922 | Clear Creek 7.5-min. | Washington | W 1/2 NE | 9 | 3 N. | 5 W. | mollusks |
| 0923 | Clear Creek 7.5-min. | Washington | SW NW | 10 | 3 N. | 5 W. | mollusks and foraminifers; foraminifers also collected and studied by Shaw (1986) in his Sunset Camp section. |
| 0924a | Clear Creek 7.5-min. | Washington | SW SW | 10 | 3 N. | 5 W. | mollusks |
| 0924b | Clear Creek 7.5-min. | Washington | SW | 10 | 3 N. | 5 W. | foraminifers; part of Shaw's (1986) Sunset Camp section; possibly the Zone should be *Bulimina schencki-Plectofrondicularia* cf. *P. jenkinsi*. Narizian benthonic foraminiferal stage is correlative to the middle to late Eocene (Armentrout, 1981). |
| 0925 | Timber 7.5-min. | Washington | NW | 15 | 3 N. | 5 W. | mollusks |
| 0926 | Timber 7.5-min. | Washington | NE NW | 22 | 3 N. | 5 W. | foraminifers |
| 0927 | Timber 7.5-min | Washington | NW NE | 22 | 3 N. | 5 W. | foraminifers; identified by W. W. Rau (WDGER); outer shelf to upper bathyal (100 to 500 m water depth) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0928 | W87-40F | 45°42'56" | 123°17'24" | Cowlitz Formation | Eocene - late | Narizian - latest | --- | R. E. Wells (USGS, unpub. mapping) | |
| 0929 | F103, F104 | 45°42'38" | 123°21'00" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0930 | 9-30-1 | 45°42'25" | 123°20'30" | Cowlitz Formation | Eocene - late | Narizian - early to Refugian - early | --- | Jackson (1983) | |
| 0931 | 9-30-2 | 45°42'22" | 123°20'05" | Cowlitz Formation | Eocene | Ulatisian - upper to Refugian | --- | Jackson (1983) | |
| 0932 | M121 (USNM 15275) | 45°41'15" | 123°17'17" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0933 | M106, M107 (USNM 15277, 15276) | 45°42'23" | 123°16'58" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0934 | M105 (USNM 15313) | 45°42'30" | 123°16'04" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0935 | M88 (USNM 15512) | 45°44'56" | 123°16'28" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0936 | M90, FM92 (USNM 15284&5, 15283) | 45°44'36" | 123°16'17" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0937 | FM94, FM95 (USNM 15282, 15281) | 45°44'21" | 123°15'46" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0938 | FM97, FM98, FM99 (USNM 15280, 15279, 15517) | 45°43'53" | 123°15'06" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0939 | M101 | 45°43'47" | 123°14'57" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0940 | FM110, M113, F114 (USNM 15267, 15581 & 15582, --) | 45°45'20" | 123°12'15" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0928 | Timber 7.5-min. | Washington | SE SW | 22 | 3 N. | 5 W. | foraminifers identical to Beck's (1943) Cowlitz fauna; identified by W. W. Rau (WDGER); outer shelf to upper bathyal (100 to 500 m water depths) |
| 0929 | Timber 7.5-min. | Washington | SW SE | 30 | 3 N. | 5 W. | foraminifers; foraminifers also collected and studied by Shaw (1986) in his Nehalem River section |
| 0930 | Timber 7.5-min. | Washington | NE NE | 31 | 3 N. | 5 W. | foraminifers; identified by Daniel R. McKeel; foraminifers also collected and studied by Shaw (1986) in his Nehalem River section |
| 0931 | Timber 7.5-min. | Washington | NW NW | 32 | 3 N. | 5 W. | foraminifers; identified by Daniel R. McKeel |
| 0932 | Timber 7.5-min. | Washington | SE NW | 3 | 2 N. | 5 W. | mollusks |
| 0933 | Timber 7.5-min. | Washington | NW NE | 34 | 3 N. | 5 W. | mollusks |
| 0934 | Timber 7.5-min. | Washington | SE SW | 26 | 3 N. | 5 W. | mollusks |
| 0935 | Timber 7.5-min. | Washington | NW NW | 14 | 3 N. | 5 W. | mollusks |
| 0936 | Timber 7.5-min. | Washington | S 1/2 NW | 14 | 3 N. | 5 W. | mollusks and foraminifers |
| 0937 | Timber 7.5-min. | Washington | NW SE | 14 | 3 N. | 5 W. | mollusks and foraminifers |
| 0938 | Timber 7.5-min. | Washington | NW | 24 | 3 N. | 5 W. | mollusks and foraminifers; east end of Sunset Tunnel |
| 0939 | Buxton 7.5-min. | Washington | SE NW | 24 | 3 N. | 5 W. | mollusks |
| 0940 | Vernonia 7.5-min. | Washington | NW SE | 8 | 3 N. | 4 W. | mollusks and foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0941 | M109, M111, FM112 (USNM 15508, 15269, 15268) | 45°45'30" | 123°11'55" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | Moore and Vokes (1953) |
| 0942 | M115, M116 (USNM 15544, 15545) | 45°43'57" | 123°11'22" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0943 | USGS Cenozoic loc. no. M3866 | 45°43'10" | 123°11'05" | Pittsburg Bluff Fm. - near top | Oligocene - middle | --- | --- | Moore (1976) | |
| 0944 | USGS Cenozoic loc. no. M3868 | 45°42'55" | 123°10'55" | Pittsburg Bluff Fm. - near top | Oligocene - middle | --- | --- | Moore (1976) | |
| 0945 | M117 (USNM 15519) | 45°42'55" | 123°10'55" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0946 | M118 (USNM 15499) | 45°42'45" | 123°10'57" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0947 | M124 (USNM 15278) | 45°41'15" | 123°12'12" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0948 | M125 (USNM 15500) | 45°41'25" | 123°11'00" | Beds of Blakeley age | Oligocene - Miocene | --- | --- | Warren and others (1945) | |
| 0949 | M126, M127 (USNM 15614, 15546) | 45°40'02 | 123°09'50" | Beds of Blakeley age | Oligocene - Miocene | --- | --- | Warren and others (1945) | |
| 0950 | F56 | 45°50'42" | 123°12'05" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0951 | M55 | 45°51'15" | 123°11'50" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0952 | KAM 1040-1045, KAM 236-238 | 45°52'48" | 123°13'52" | Keasey Formation | Eocene - late | Refugian - early | *Bulimina schencki-Plectofrondicularia* cf. *P. jenkinsi* | McDougall (1975, 1979) | |
| 0953 | KAM 228-231 | 45°52'43" | 123°12'51" | Keasey Formation | Eocene - late | Refugian - early | *Bulimina schencki-Plectofrondicularia* cf. *P. jenkinsi* | McDougall (1979) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0941 | Vernonia 7.5-min. | Washington | NW SE | 8 | 3 N. | 4 W. | Tertiary crinoid = *Isocrinus nehalemensis* |
| 0942 | Buxton 7.5-min. | Washington | SE NW | 21 | 3 N. | 4 W. | mollusks |
| 0943 | Buxton 7.5-min. | Washington | SW NE | 28 | 3 N. | 4 W. | mollusks |
| 0944 | Buxton 7.5-min. | Washington | SW NE | 28 | 3 N. | 4 W. | mollusks |
| 0945 | Buxton 7.5-min. | Washington | SW NE | 28 | 3 N. | 4 W. | mollusks |
| 0946 | Buxton 7.5-min. | Washington | NW SE | 28 | 3 N. | 4 W. | mollusks |
| 0947 | Buxton 7.5-min. | Washington | SW NE | 5 | 2 N. | 4 W. | mollusks |
| 0948 | Buxton 7.5-min. | Washington | SW NE | 4 | 2 N. | 4 W. | mollusks; "Blakeley" age in older literature is equivalent to Matlockian molluscan stage of Addicott (1976, 1981) which is correlative to the early Oligocene (Armentrout, 1981). |
| 0949 | Buxton 7.5-min. | Washington | SW SE | 10 | 2 N. | 4 W. | mollusks; "Blakeley" age in older literature is equivalent to Matlockian molluscan stage of Addicott (1976, 1981) which is correlative to the early Oligocene (Armentrout, 1981). |
| 0950 | Vernonia 7.5-min. | Columbia | NW SE | 8 | 4 N. | 4 W. | foraminifers |
| 0951 | Vernonia 7.5-min. | Columbia | SE SE | 5 | 4 N. | 4 W. | mollusks |
| 0952 | Pittsburg 7.5-min. | Columbia | NW NW | 31 | 5 N. | 4 W. | foraminifers |
| 0953 | Pittsburg 7.5-min. | Columbia | SW NW | 32 | 5 N. | 4 W. | foraminifers |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0954 | KAM 215-219 | 45°52'39" | 123°11'56" | Keasey Formation | Eocene - late or Oligocene - early | Refugian - late | *Bulimina schencki-Plectofrondicularia* cf. *P. jenkinsi* | McDougall (1979) | |
| 0955 | KAM 222-225 | 45°52'15" | 123°11'41" | Keasey Formation | Eocene - late or Oligocene - early | Refugian - late | *Bulimina schencki-Plectofrondicularia* cf. *P. jenkinsi* | McDougall (1979) | |
| 0956 | F53 & F54 | 45°51'25" | 123°11'25" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 0957 | USGS Cenozoic loc. no. M3874 | 45°51'35" | 123°09' | Pittsburg Bluff Fm. - middle | Oligocene - middle | --- | --- | Moore (1976) | |
| 0958 | USGS Cenozoic loc. no. M3872 | 45°49'45" | 123°09'45" | Pittsburg Bluff Formation | Oligocene - middle | --- | --- | Moore (1976) | |
| 0959 | USGS Cenozoic loc. no. M3871 | 45°49' | 123°10' | Pittsburg Bluff Fm. - upper-middle | Oligocene - middle | --- | --- | Moore (1976) | |
| 0960 | M57 | 45°49'02" | 123°08'15" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0961 | USGS Cenozoic loc. no. M3878 | 45°52'30" | 123°07'30" | Pittsburg Bluff Formation | Oligocene - middle | --- | --- | Moore (1976) | |
| 0962 | M52 (USNM 15310 & 11) | 45°51'55" | 123°06'58" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0963 | USGS Cenozoic loc. no. M3856 | 45°51'45" | 123°06'30" | Pittsburg Bluff Fm. - middle | Oligocene - middle | --- | --- | Moore (1976) | |
| 0964 | M58 (USNM 15312) | 45°51'25" | 123°06'25" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0965 | USGS Cenozoic loc. no. M3857 | 45°51'20" | 123°06'15" | Pittsburg Bluff Fm. - middle | Oligocene - middle | --- | --- | Moore (1976) | |
| 0966 | USGS Cenozoic loc. no. M3877 | 45°51' | 123°06'45" | Pittsburg Bluff Fm. - middle | Oligocene - middle | --- | --- | Moore (1976) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0954 | Pittsburg 7.5-min. | Columbia | NE NE | 32 | 5 N. | 4 W. | foraminifers |
| 0955 | Vernonia 7.5-min. | Columbia | SE SE | 32 | 5 N. | 4 W. | foraminifers |
| 0956 | Vernonia 7.5-min. | Columbia | NW SW | 4 | 4 N. | 4 W. | foraminifers; foraminifers recollected and studied by McDougall (1979) |
| 0957 | Vernonia 7.5-min. | Columbia | w 1/2 | 2 | 4 N. | 4 W. | mollusks |
| 0958 | Vernonia 7.5-min. | Columbia | center? | 15 | 4 N. | 4 W. | mollusks |
| 0959 | Vernonia 7.5-min. | Columbia | center? | 22 | 4 N. | 4 W. | mollusks |
| 0960 | Vernonia 7.5-min. | Columbia | SW NE | 23 | 4 N. | 4 W. | mollusks |
| 0961 | Bacona 7.5-min. | Columbia | W 1/2 | 36 | 5 N. | 4 W. | mollusks |
| 0962 | Bacona 7.5-min. | Columbia | NE | 1 | 4 N. | 4 W. | mollusks |
| 0963 | Bacona 7.5-min. | Columbia | NW | 6 | 4 N. | 3 W. | mollusks |
| 0964 | Bacona 7.5-min. | Columbia | SW | 6 | 4 N. | 3 W. | mollusks |
| 0965 | Bacona 7.5-min. | Columbia | SW | 6 | 4 N. | 3 W. | mollusks |
| 0966 | Bacona 7.5-min. | Columbia | NE NE | 12 | 4 N. | 4 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0967 | M59 | 45°50'20" | 123°05'00" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0968 | M61 & M62 (USNM 15516 & 15530) | 45°49'57" | 123°02'12" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0969 | USGS Cenozoic loc. no. M3858 | 45°50'10" | 123°02'12" | Pittsburg Bluff Fm. - near top | Oligocene - middle | --- | --- | Moore (1976) | |
| 0970 | M60 (USNM 15531) | 45°50'10" | 123°00'45" | Beds of Blakeley age | Oligocene - Miocene | --- | --- | Warren and others (1945) | |
| 0971 | M63 (USNM 15532) | 45°49'35" | 122°59'40" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0972 | M64 (USNM 15537) | 45°49'30" | 122°58'20" | Pittsburg Bluff Formation | Oligocene | --- | --- | Warren and others (1945) | |
| 0973 | near Heisson | 45°49'57" | 122°29'50" | Skamania Volcanic Series | Eocene - late | --- | --- | Trimble (1963) | |
| 0974 | Jackson Creek locality | 45°48'20" | 122°55'12" | Scappoose Formation | Miocene - early | --- | --- | Trimble (1963) | |
| 0975 | M119 (USNM 15513) | 45°46'50" | 122°54'05" | Beds of Blakeley age; Scappoose Fm. of Warren and Norbisrath (1946) | Oligocene - Miocene | --- | --- | Warren and others (1945) | Wilkinson and others (1946) |
| 0976 | M120 (USNM 15598) | 45°37'22" | 123°52'25" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0977 | W83-85 | 45°36'45" | 123°50'30" | --- | Eocene - late | Narizian - late or Refugian | --- | R. E. Wells (USGS unpub. mapping) | |
| 0978 | F130 | 45°33'32" | 123°53'40" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 0979 | MR72-16 | 45°31'42" | 123°53'46.5" | Astoria Formation | Oligocene - Miocene | Zemorrian - Saucesian | --- | R. E. Wells (USGS, unpub. mapping) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0967 | Bacona 7.5-min. | Columbia | SE SW | 8 | 4 N. | 3 W. | mollusks |
| 0968 | Bacona 7.5-min. | Columbia | SE | 16 | 4 N. | 3 W. | mollusks |
| 0969 | Bacona 7.5-min. | Columbia | N 1/2 NW | 15 | 4 N. | 3 W. | mollusks |
| 0970 | Bacona 7.5-min. | Columbia | NE NE | 14 | 4 N. | 3 W. | mollusks |
| 0971 | Chapman 7.5-min. | Columbia | NW SE | 13 | 4 N. | 3 W. | mollusks |
| 0972 | Chapman 7.5-min. | Columbia | SE SE | 18 | 4 N. | 2 W. | mollusks |
| 0973 | Yacolt 7.5-min. | Clark | SE NE | 13 | 4 N. | 2 E. | fossil flora; identified by R. W. Brown (USGS) |
| 0974 | Chapman 7.5-min. | Columbia | SE SW | 22 | 3 N. | 2 W. | mollusks by Ralph Stewart and Ellen J. Trumbull (USGS) |
| 0975 | Chapman 7.5-min. | Multnomah | NW SW | 35 | 3 N. | 2 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0976 | Kilchis River 7.5-min. | Tillamook | SE SW | 26 | 2 N. | 10 W. | mollusks; identified by W. O. Addicott (USGS) |
| 0977 | Kilchis River 7.5-min. | Tillamook | SW NW | 31 | 2 N. | 9 W. | foraminifers; identified by W. W. Rau (WDGER); distinctly a shallow-water beach-type assemblage; littoral or inner neritic |
| 0978 | Garibaldi 7.5-min. | Tillamook | NE SW | 22 | 1 N. | 10 W. | foraminifers |
| 0979 | Garibaldi 7.5-min. | Tillamook | NE SW | 34 | 1 N. | 10 W. | foraminifers; identified by W. W. Rau (WDGER) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 0980 | MTil 68-1 | 45°30'1.5" | 123°36'24" | Yamhill? Formation | Eocene - early and middle or older | Ulatisian or older | — | R. E. Wells (USGS, unpub. mapping) | |
| 0981 | W86-16 | 45°32'13.5" | 123°34'43.5" | Yamhill? Formation | Eocene | — | CP11-12a | R. E. Wells (USGS, unpub. mapping) | |
| 0982 | W86-17 | 45°32'13.5" | 123°34'2" | Yamhill? Formation | Eocene | — | CP11-12a | R. E. Wells (USGS, unpub. mapping) | |
| 0983 | W83-15N | 45°32'13.5" | 123°33'21" | Yamhill? Formation | Eocene | — | CP12b? | R. E. Wells (USGS, unpub. mapping) | |
| 0984 | W83-51 | 45°32'13.5" | 123°33'21" | Yamhill? Formation | Eocene - early and middle or older | Ulatisian | — | R. E. Wells (USGS unpub. mapping) | |
| 0985 | MR69-237 | 45°35'30" | 123°30'51" | Yamhill Formation | Eocene - middle to late | Narizian | — | R. E. Wells (USGS, unpub. mapping) | |
| 0986 | W83-1 | 45°36'20" | 123°26'06" | --- | Eocene - late | Refugian or Narizian | — | R. E. Wells (USGS unpub. mapping) | |
| 0987 | F-5 | 45°37'21" | 123°22'34" | Siletz River Volcanics - uppermost | Eocene - middle | Ulatisian | — | Soper (1974) | |
| 0988 | W85-41F | 45°32'12" | 123°15'19" | Yamhill? Formation | Eocene - middle | --- | — | R. E. Wells (USGS, unpub. mapping) | |
| 0989 | W83-7F | 45°38'58.5" | 123°20'27" | Yamhill? Formation | Eocene - middle to late | Narizian | — | R. E. Wells (USGS, unpub. mapping) | |
| 0990 | W87-14F | 45°38'40.5" | 123°17'41" | Cowlitz or Keasey Formation | Eocene - late | Narizian - late | — | R. E. Wells (USGS, unpub. mapping) | |
| 0991 | SR 61-31 | 45°38'57" | 123°16'18" | Cowlitz or Keasey Formation | Eocene - middle to late | Narizian | — | R. E. Wells (USGS, unpub. mapping) | |
| 0992 | M128 (USNM 15540) | 45°37'15" | 123°12'30" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0980 | Jordan Creek 7.5-min. | Tillamook | SE SE | 1 | 1 S. | 8 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0981 | Jordan Creek 7.5-min. | Tillamook | SW SW | 29 | 1 N. | 7 W. | coccoliths; identified by David Bukry (USGS); CP11-12a zones are correlative to the late-early Eocene (Bukry and Snavely, 1988) |
| 0982 | Jordan Creek 7.5-min. | Tillamook | SW SE | 29 | 1 N. | 7 W. | coccoliths; identified by David Bukry (USGS); CP11-12a zones are correlative to the late-early Eocene (Bukry and Snavely, 1988) |
| 0983 | Jordan Creek 7.5-min. | Tillamook | SW SW | 28 | 1 N. | 7 W. | coccoliths; identified by David Bukry (USGS); CP12b zone is correlative to the early-middle Eocene (Bukry and Snavely, 1988) |
| 0984 | Jordan Creek 7.5-min. | Tillamook | SW SW | 28 | 1 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER); upper bathyal conditions |
| 0985 | Jordan Creek 7.5-min. | Tillamook | SW SW | 2 | 1 N. | 7 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0986 | Woods Point 7.5-min. | Tillamook | NE NW | 4 | 1 N. | 6 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0987 | Woods Point 7.5-min. | Tillamook | SW SW | 25 | 2 N. | 6 W. | foraminifers in thin limestone lens; identified by W. N. Orr (Univ. of Oregon) and W. W. Rau (WDGER); probably sedimentary strata within Tillamook Volcanics |
| 0988 | Roaring Creek 7.5-min. | Washington | SW SW | 25 | 1 N. | 5 W. | foraminifers; identified by W. W. Rau (WDGER); |
| 0989 | Timber 7.5-min. | Washington | NE NE | 19 | 2 N. | 5 W. | foraminifers; identified by W. W. Rau (WDGER); middle bathyal conditions |
| 0990 | Timber 7.5-min | Washington | SW SW | 15 | 2 N. | 5 W. | foraminifers; identified by W. W. Rau (WDGER); |
| 0991 | Timber 7.5-min. | Washington | NE NW | 23 | 2 N. | 5 W. | foraminifers; identified by W. W. Rau (WDGER) |
| 0992 | Gales Creek 7.5-min. | Washington | NE NW | 32 | 2 N. | 4 W. | mollusks |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 0993 | M129 (USNM 15496) | 45°40'39" | 123°04'00" | Beds of Blakeley age | Oligocene - Miocene | --- | --- | Warren and others (1945) | |
| 0994 | USGS Cenozoic locality 19864 | 45°39'32" | 122°59'30" | Scappoose Formation | Oligocene - late or Miocene - early | --- | --- | Trimble (1963) | --- |
| 0995 | Sandy River | 45°32'25" | 122°22'50" | Troutdale Formation | Pliocene - early | --- | --- | Trimble (1963) | |
| 0996 | West Fork of Washougal River | 45°36'58" | 122°13'05" | Skamania Volcanic Series | Oligocene | --- | --- | Trimble (1963) | |
| 0997 | N84-196 | 46°06'30" | 123°23'55" | Astoria Formation | Miocene - early or middle | Pillarian? or Newportian? | --- | A. R. Niem (unpub. data) | |
| 0998 | OC 212 | 46°06'50" | 123°23'05" | Astoria Formation | Miocene - early or middle | Pillarian or Newportian | --- | Goalen (1988) | |
| 0999 | 246 | 46°06'55" | 123°22'55" | Astoria Formation | Miocene - early or middle | Pillarian or Newportian | --- | Murphy (1981) | |
| 1000 | N84-316 | 45°48'15" | 123°50'22" | Astoria Fm., Angora Peak Member | Miocene - early or middle | Pillarian or Newportian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 1001 | N84-312 | 45°47'55" | 123°49'15" | Smuggler Cove formation | Oligocene | Zemorrian | --- | A. R. Niem (unpub. data) | see also Niem and Niem (1985) |
| 1002 | R398 | 45°45'25" | 123°47'15" | Hamlet formation | Eocene - late | Narizian - late to Refugian - early | --- | Rarey (1986) | see also Niem and Niem (1985) |
| 1003 | 57-, 58-, 59-88 | 45°28'50" | 123°59'02" | Astoria Fm. - Angora Peak Member | Miocene | --- | --- | Parker (1990) | |
| 1004 | 160/9/74 | 45°28'35" | 123°58'58" | Astoria Fm. - Angora Peak Member | Miocene | --- | --- | Cooper (1981) | |
| 1005 | W87-8F | 45°38'05" | 123°21'21" | Yamhill? Fm., possibly Cowlitz Fm. | Eocene - late | Narizian - late | --- | R. E. Wells (USGS, unpub. mapping) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 0993 | Meacham Corner 7.5-min. | Washington | NW NW | 9 | 2 N. | 3 W. | mollusks |
| 0994 | Dixie Mountain 7.5-min. | Washington | SE NE | 13 | 2 N. | 3 W. | mollusks; identified by Ellen J. Trumbull (USGS) |
| 0995 | Camas 7.5-min. | Multnomah | NE SW | 25 | 1 N. | 3 E. | fossil flora; identified by R. W. Brown (USGS) |
| 0996 | Bridal Veil 7.5-min. | Skamania | SE NW | 32 | 2 N. | 5 E. | fossil flora; identified by R. W. Brown (USGS) |
| 0997 | Nicolai Mtn. 7.5-min. | Clatsop | SE NW | 11 | 7 N. | 6 W. | mollusks |
| 0998 | Nicolai Mtn. 7.5-min. | Clatsop | SE SE | 2 | 7 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 0999 | Nicolai Mtn. 7.5-min. | Clatsop | SW SW | 1 | 7 N. | 6 W. | mollusks; identified by E. J. Moore (USGS) |
| 1000 | Soapstone Lake 7.5-min. | Clatsop | W 1/2 SW | 30 | 4 N. | 9 W. | mollusks; identified by E. J. Moore (USGS) |
| 1001 | Soapstone Lake 7.5-min. | Clatsop | SW SW | 29 | 4 N. | 9 W. | foraminifers; identified by Daniel R. McKeel |
| 1002 | Soapstone Lake 7.5-min. | Tillamook | W 1/2 SE | 9 | 3 N. | 9 W. | foraminifers; identified by K. A. McDougall (USGS) |
| 1003 | Netarts 7.5-min. | Tillamook | SW | 15 | 1 S. | 10 W. | mollusks; identified by E. J. Moore (USGS, retired) |
| 1004 | Netarts 7.5-min. | Tillamook | NW | 22 | 1 S. | 10 W. | mollusks; identified by W. O. Addicott (USGS) |
| 1005 | Timber 7.5-min. | Washington | NW SW | 19 | 2 N. | 5 W. | foraminifers; identified by W. W. Rau (WDGER); typical of mid-bathyal environment (1,000 to 2,000 m water depths) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|
| 1006a | M131 (USNM 15599) | 45°34'06" | 123°12'26" | Cowlitz Formation | Eocene - late | --- | --- | Warren and others (1945) | |
| 1006b | F-3 | 45°34'06" | 123°12'26" | Yamhill Formation | Eocene - late-early | --- | A-2 zone of Laiming (1940) | Schlicker and Deacon (1967) | |
| 1007 | M132, M133 (USNM 15274, 15525) | 45°33'07" | 123°10'50" | Keasey Formation | Eocene - late or Oligocene - early | --- | --- | Warren and others (1945) | |
| 1008 | PSUB0003 | 45°28'12" | 123°12'13" | Spencer Formation | Eocene - late | "Tejon" | --- | Al-Azzaby (1980) | |
| 1009a | F-5 | 45°28'35" | 123°12'04" | Spencer Formation | Eocene - late | Narizian | --- | Schlicker and Deacon (1967) | |
| 1009b | PSUB0001, PSUB0002 | 45°28'35" | 123°12'04" | Spencer Formation | Eocene - late | "Tejon" | --- | Al-Azzaby (1980) | |
| 1010 | PSUB0010 | 45°28'49" | 123°08'48" | Pittsburg Bluff Formation | Oligocene - middle or late | "Lincoln" or "Blakeley" | --- | Al-Azzaby (1980) | |
| 1011 | M144 (USNM 15600) | 45°29'48" | 123°05'22" | Beds of Blakeley Age | Oligocene | "Blakeley" | --- | Warren and others (1945) | |
| 1012 | SM91-70 | 46°33'10" | 123°34'15" | McIntosh Formation - upper | Eocene - middle | Narizian - early | *Uvigerina* cf. *U. yazooensis* | Moothart (in prep.) | |
| 1013 | SM91-57 | 46°32'42" | 123°33'45" | McIntosh Formation - upper | Eocene - middle | Narizian - early | *Uvigerina* cf. *U. yazooensis* | Moothart (in prep.) | |
| 1014 | SM91-38 | 46°31'46" | 123°34'00" | McIntosh Formation - lower | Eocene - middle to late | Narizian | *Bulimina schencki* - *Plectofrondicularia* cf. *P. jenkinsi* | Moothart (in prep.) | |
| 1015 | SM91-85 | 46°30'53" | 123°33'24" | Crescent Formation - sedimentary interbeds in pillow basalts | Eocene - early to middle | Ulatisian to Narizian - early | --- | Moothart (in prep.) | |
| 1016 | SM91-170 | 46°28'27" | 123°35'20" | Crescent Formation - sedimentary interbeds in pillow basalts | Eocene - middle | Narizian - early (or older) | *Uvigerina* cf. *U. yazooensis* | Moothart (in prep.) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 1006a | Gales Creek 7.5-min. | Washington | NE SW | 17 | 1 N. | 4 W. | mollusks |
| 1006b | Gales Creek 7.5-min. | Washington | NE SW | 17 | 1 N. | 4 W. | foraminifers; identified by W. W. Rau (WDGER); A-2 zone of Laiming is correlative to the late Ulatisian and early Narizian benthonic foraminiferal stages (Almgren and others, 1988) which is equivalent to late-early to early-middle Eocene (Armentrout, 1981) |
| 1007 | Gales Creek 7.5-min. | Washington | SE SE | 21 | 1 N. | 4 W. | mollusks |
| 1008 | Gaston 7.5-min. | Washington | SW NE | 20 | 1 S. | 4 W. | mollusks; identified by Carole Hickman (Univ. of California, Berkeley); "Tejon" molluscan stage is equivalent to the Narizian benthonic foraminiferal stage (Addicott, 1981). Mollusks (sample M140) also collected at this locality by Warren and others (1945). |
| 1009a | Gaston 7.5-min. | Washington | NW NE | 20 | 1 S. | 4 W. | foraminifers; identified by W. W. Rau (WDGER). Sample was core from foundation borings for the proposed Scoggins dam (base of Henry Hagg Lake). |
| 1009b | Gaston 7.5-min. | Washington | NW NE | 20 | 1 S. | 4 W. | mollusks; identified by Carole Hickman (Univ. of California, Berkeley); "Tejon" molluscan stage is equivalent to the Narizian benthonic foraminiferal stage (Addicott, 1981). Mollusks (sample M139) also collected at this locality by Warren and others (1945). |
| 1010 | Gaston 7.5-min. | Washington | NE SW | 14 | 1 S. | 4 W. | mollusks; identified by Carole Hickman (Univ. of California, Berkeley); "Lincoln" stage is equivalent to the Galvinian molluscan stage (Addicott, 1981); "Blakeley" stage is equivalent to the Matlockian molluscan stage (Addicott, 1981). |
| 1011 | Laurelwood 7.5-min. | Washington | SW SW | 8 | 1 S. | 3 W. | mollusks; "Blakeley" stage is equivalent to the Matlockian molluscan stage (Addicott, 1981) which is correlative to the early Oligocene (Armentrout, 1981). |
| 1012 | Lebam 7.5-min. | Pacific | SW NE | 5 | 12 N. | 7 W. | foraminifers; identified by Daniel R. McKeel; middle to lower bathyal (1500 to 2000 m) |
| 1013 | Lebam 7.5-min. | Pacific | W 1/2 SW | 4 | 12 N. | 7 W. | foraminifers; identified by Daniel R. McKeel; middle to lower bathyal (1500 to 2000 m) |
| 1014 | Lebam 7.5-min. | Pacific | NE NE | 8 | 12 N. | 7 W. | foraminifers; identified by Daniel R. McKeel; upper bathyal (150 to 500 m) |
| 1015 | Lebam 7.5-min. | Pacific | center SW | 16 | 12 N. | 7 W. | foraminifers; identified by Daniel R. McKeel; middle to lower bathyal (1500 to 2000 m) |
| 1016 | Sweigiler Creek 7.5-min. | Pacific | center SE | 31 | 12 N. | 7 W. | foraminifers; identified by Daniel R. McKeel; open marine |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Epoch | Stage | Zone | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|
| 1017 | SM91-138 | 46°29'13" | 123°32'06" | Crescent Formation - sedimentary interbeds in pillow basalts | Eocene - early | Ulatisian | *Vaginulinopsis vacavillensis* assemblage | Moothart (in prep.) | |
| 1018 | SM91-167 | 46°28'56" | 123°27'57" | Crescent Formation - sedimentary interbeds in pillow basalts | Eocene - middle | Narizian - early | *Uvigerina* cf. *U. yazooensis* | Moothart (in prep.) | |
| 1019 | SM91-159 | 46°27'54" | 123°29'57" | McIntosh Formation - lower | Eocene - middle | Narizian - early | *Uvigerina* cf. *U. yazooensis* | Moothart (in prep.) | |

| Map No. | Quad | County | qtr of qtr | sec | T | R | Comments |
|---|---|---|---|---|---|---|---|
| 1017 | Sweigiler Creek 7.5-min. | Pacific | NE SW | 27 | 12 N. | 7 W. | foraminifers; identified by Daniel R. McKeel; upper to middle bathyal (150 to 500 m) |
| 1018 | Blaney Creek 7.5-min. | Pacific | NE NE | 31 | 12 N. | 6 W. | foraminifers; identified by Daniel R. McKeel; middle to lower bathyal (1500 to 2000 m) |
| 1019 | Blaney Creek 7.5-min. | Pacific | NW NW | 1 | 11 N. | 7 W. | foraminifers; identified by Daniel R. McKeel; upper to middle bathyal (500 to 1500 m) |

Table 2. Isotopic Dates in Southwestern Washington and Northwestern Oregon (abbreviations used in this table: Ar/Ar = $^{40}Ar/^{39}Ar$; C-14 = $^{14}$ carbon; F-T = fission track; Pb-alpha = lead-alpha; U/Pb = uranium-lead)

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 001a | D80-CV-24 | 47°32'04" | 122°41'12" | Crescent Fm. - volcanics | 43.3 | 0.5 | whole rock | K/Ar | Duncan (1982) | |
| 001b | D80-CV-24 | 47°32'04" | 122°41'12" | Crescent Fm. - volcanics | 46.9 | 0.6 | whole rock | K/Ar | Duncan (1982) | |
| 001c | D80-CV-24 | 47°32'04" | 122°41'12" | Crescent Fm. - volcanics | 51.7 | 2.4 | whole rock | Ar/Ar | Duncan (1982) | |
| 002a | D80-CV-25 | 47°32'04" | 122°41'12" | Crescent Fm. - volcanics | 49.2 | 0.6 | whole rock | K/Ar | Duncan (1982) | |
| 002b | D80-DV-25 | 47°32'04" | 122°41'12" | Crescent Fm. - volcanics | 55.0 | 0.9 | whole rock | Ar/Ar | Duncan (1982) | |
| 003 | no data point on map | | | | | | | | | |
| 004a | D80-CV-26 | 47°32'04" | 122°41'12" | Crescent Fm. - volcanics | 45.2 | 0.5 | whole rock | K/Ar | Duncan (1982) | |
| 004b | D80-CV-26 | 47°32'04" | 122°41'12" | Crescent Fm. - volcanics | 55.3 | 3.1 | whole rock | Ar/Ar | Duncan (1982) | |
| 005 | W-777 | 47°25' | 122°21' | peat above Glacier Peak ash | 6630 yrs. | 400 yrs. | peat | C-14 | Rubin and Alexander (1960) | |
| 006 | | 47°25' | 122°21' | peat below Glacier Peak ash | 6600 yrs. | 400 yrs. | peat | C-14 | Rubin and Alexander (1960) | |
| 007 | W-779 | 47°26' | 122°18' | peat overlying Glacier Peak ash | 5950 yrs. | 400 yrs. | peat | C-14 | Rubin and Alexander (1960) | |
| 008 | W-671 | 47°30' | 122°15' | stratified sand over gray clayey till | >38,000 yrs. | --- | wood | C-14 | Rubin and Alexander (1960) | |
| 009 | 4 (RWT-608-79) | 47°29.2' | 121°30.7' | Snoqualmie batholith | 19.7 | 0.7 | biotite | K/Ar | Frizzell and others (1984) | |
| 010 | 26 (RWT-252-81) | 47°23.1' | 121°47.6' | volcanic rocks of Huckleberry Mountain | 24.7 | 1.7 | zircon | F-T | Frizzell and others (1984) | |
| 011 | 71 (PEH 3-68) | 47°21'00" | 121°34.5' | Snoqualmie batholith (granodiorite) | 16.5 | 2 | biotite | K/Ar | Engels and others (1976) | Laursen and Hammond (1974); Frizzell and others (1984) |
| 012 | 73 | 47°23' | 121°28' | Snoqualmie batholith (granodiorite) | 17 | --- | biotite | K/Ar | Engels and others (1976) | Lipson and others (1961), p. 460; Frizzell and others (1984) |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 001a | Bremerton West 7.5-min. | Kitsap | NE NW | 33 | 24 N. | 1 E. | Duncan (1982) noted "argon loss suspected". |
| 001b | Bremerton West 7.5-min. | Kitsap | NE NW | 33 | 24 N. | 1 E. | Duncan (1982) noted "argon loss suspected". |
| 001c | Bremerton West 7.5-min. | Kitsap | NE NW | 33 | 24 N. | 1 E. | |
| 002a | Bremerton West 7.5-min. | Kitsap | NE NW | 33 | 24 N. | 1 E. | Duncan (1982) noted "argon loss suspected". |
| 002b | Bremerton West 7.5-min. | Kitsap | NE NW | 33 | 24 N. | 1 E. | |
| 003 | --- | --- | --- | --- | --- | --- | |
| 004a | Bremerton West 7.5-min. | Kitsap | NE NW | 33 | 24 N. | 1 E. | Duncan (1982) noted "argon loss suspected". |
| 004b | Bremerton West 7.5-min. | Kitsap | NE NW | 33 | 24 N. | 1 E. | |
| 005 | Des Moines 7.5-min. | King | NE | 6 | 22 N. | 4 E. | |
| 006 | Des Moines 7.5-min. | King | NE | 6 | 22 N. | 4 E. | |
| 007 | Des Moines 7.5-min. | King | center E 1/2 | 33 | 23 N. | 4 E. | |
| 008 | Renton 7.5-min. | King | NE SW | 12 | 23 N. | 4 E. | |
| 009 | Bandera 7.5-min. | King | NE | 15 | 23 N. | 10 E. | |
| 010 | North Bend 7.5-min. | King | NW NW | 21 | 22 N. | 8 E. | |
| 011 | Cougar Mtn. 7.5-min. | King | NE SW | 30 | 22 N. | 10 E. | Frizzell and others corrected date to 16.9 +/- 2 Ma after Dalrymple (1979) |
| 012 | Snoqualmie Pass 7.5-min. | King | NE NE | 24 | 22 N. | 10 E. | Frizzell and others (1984) corrected date to 17.4 Ma after Dalrymple (1979) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 013 | 72 (PEH 2-68) | 47°23.7' | 121°27.5' | Snoqualmie batholith (granodiorite) | 20 | 2 | biotite | K/Ar | Engels and others (1976) | Laursen and Hammond (1974), p. 19; Frizzell and others (1984) |
| 014 | 74 (AK 91) | 47°24.1' | 121°26.9' | Snoqualmie batholith (granodiorite) | 18 | 0.9 | biotite | K/Ar | Engels and others (1976) | Baadsgaard and others (1961), p. 697; Frizzell and others (1984) |
| 015 | 35 (DT-78-32A) | 47°16.9' | 121°58.7' | Puget Group | >43.4 | 1.9 | plagioclase | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 016 | 31 (DT-78-20) | 47°17.8' | 121°57.3' | volcanic rocks of Huckleberry Mountain | >29.1 | 1.8 | whole rock | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 017 | 39 (DT-78-31B) | 47°18' | 121°57' | Puget Group | 45.0 | 2.1 | plagioclase | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 018 | 36 (DT-78-26) | 47°18.7' | 121°57.3' | Puget Group | 41.2 | 1.8 | plagioclase | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 019 | 37 (DT-78-27A) | 47°18.7' | 121°57.3' | Puget Group | >55.4 | 2.6 | plagioclase | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table |
| 020 | 38 (DT-78-36F) | 47°19.3' | 121°56.8' | Puget Group | >44.2 | 2.1 | plagioclase | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 021 | 40 (DT-78-37A) | 47°19.2' | 121°56' | Puget Group | 41.7 | 3.1 | plagioclase | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 022 | | 47°19.2' | 121°56' | Puget Group | 46.8 | 6.0 | apatite | F-T | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 023 | 41 (DT-78-37B) | 47°19.2' | 121°56' | Puget Group | 44.4 | 2.0 | plagioclase | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 024 | 33 (DT-78-30A) | 47°15.9' | 121°52.8' | volcanic rocks of Huckleberry Mountain | >35.2 | 2.2 | whole rock | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 025 | 27 (DT-78-28A) | 47°16' | 121°52.9' | volcanic rocks of Huckleberry Mountain | 27.9 | 1.6 | whole rock | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 026 | 32 (DT-78-27B) | 47°16.1' | 121°52.8' | volcanic rocks of Huckleberry Mountain | >32.5 | 2.0 | whole rock | K/Ar | Frizzell and others (1984) | Turner and others (1983) Table 1 |
| 027 | 24 (DB-81-421) | 47°15.2' | 121°43.2' | volcanic rocks of Eagle Gorge | 20.8 | 0.7 | zircon | F-T | Frizzell and others (1984) | |
| 028 | 9 (TWT-262-81) | 47°17' | 121°29.5' | volcanic rocks of Huckleberry Mountain | 17.6 | 0.6 | zircon | F-T | Frizzell and others (1984) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 013 | Snoqualmie Pass 7.5-min. | King | SW NW | 18 | 22 N. | 11 E. | Frizzell and others (1984) corrected date to 20.5 +/- 2 Ma after Dalrymple (1979) |
| 014 | Snoqualmie Pass 7.5-min. | King | S 1/2 SE | 7 | 22 N. | 11 E. | Frizzell and others (1984) corrected date to 18.5 +/- 0.9 Ma after Dalrymple (1979) |
| 015 | Cumberland 7.5-min. | King | NE | 25 | 21 N. | 6 E. | ash parting in coal |
| 016 | Cumberland 7.5-min. | King | NE | 19 | 21 N. | 7 E. | |
| 017 | Cumberland 7.5-min. | King | SW | 17 | 21 N. | 7 E. | ash parting in coal |
| 018 | Cumberland 7.5-min. | King | NE | 18 | 21 N. | 7 E. | ash parting in coal |
| 019 | Cumberland 7.5-min. | King | NE | 18 | 21 N. | 7 E. | age unreliable; ash parting in coal |
| 020 | Cumberland 7.5-min. | King | NW | 8 | 21 N. | 7 E. | ash parting in coal |
| 021 | Cumberland 7.5-min. | King | E 1/2 | 8 | 21 N. | 7 E. | ash parting in coal |
| 022 | Cumberland 7.5-min. | King | E 1/2 | 8 | 21 N. | 7 E. | ash parting in coal |
| 023 | Cumberland 7.5-min. | King | E 1/2 | 8 | 21 N. | 7 E. | ash parting in coal |
| 024 | Cumberland 7.5-min. | King | NW | 35 | 21 N. | 7 E. | flow breccia |
| 025 | Cumberland 7.5-min. | King | NW | 35 | 21 N. | 7 E. | intrusion |
| 026 | Cumberland 7.5-min. | King | NW | 35 | 21 N. | 7 E. | intrusion |
| 027 | Cougar Mtn. 7.5-min. | King | NW NW | 6 | 20 N. | 9 E. | |
| 028 | Lost Lake 7.5-min. | King | NE | 26 | 21 N. | 10 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 029 | 10 (RWT-525-77) | 47°17.7' | 121°26.3' | Dacite porphyry | 24.2 | 1.4 | hornblende | K/Ar | Frizzell and others (1984) | |
| 030 | W-672 | 47°13' | 122°13' | 2 ft peat that overlies 2 to 3 ft of volcanic ash | >38,000 yrs. | --- | peat | C-14 | Rubin and Alexander (1960) | |
| 031 | W-564 | 47°12' | 122°14' | top of mudflow overlain by alluvium | 4,700 yrs. | 250 | wood | C-14 | Rubin and Alexander (1960) | |
| 032 | 19 (CRS-413) | 47°08.8' | 121°42.2' | Stevens Ridge Fm. | 34.9 | 1.2 | hornblende | K/Ar | Frizzell and others (1984) | Fischer (1976) p. 51 |
| 033 | | 47°08.8' | 121°42.2' | Stevens Ridge Fm. | 23.9 | 0.9 | biotite | K/Ar | Frizzell and others (1984) | Fischer (1976) p. 51 |
| 034 | 22 (RWT-76-82) | 47°07.1' | 121°39.8' | Stevens Ridge Fm. | 21.3 | 0.7 | hornblende | K/Ar | Frizzell and others (1984) | |
| 035 | | 47°07.1' | 121°39.8' | Stevens Ridge Fm. | 22.0 | 0.8 | biotite | K/Ar | Frizzell and others (1984) | |
| 036 | D78-BH-7 | 47°01'07" | 123°14'40" | Crescent Fm. - volcanics | 55.6 | 1.2 | whole rock | K/Ar | Duncan (1982) | |
| 037 | D78-BH-6 | 47°01'12" | 123°00'37" | Crescent Fm. - volcanics | 51.8 | 1.0 | whole rock | K/Ar | Duncan (1982) | |
| 038 | W-565 | 46°59' | 122°12' | Electron mudflow | 530 yrs. | 200 yrs. | wood | C-14 | Rubin and Alexander (1960) | |
| 039 | W-706 | 47°02' | 122°05' | sand in a kettle in Vashon-age drift | 1950 yrs. | 200 yrs. | log | C-14 | Rubin and Alexander (1960) | |
| 040 | 23 (RWT-289-81) | 47°02' | 121°57.2' | Stevens Ridge Fm. | 23.1 | 0.7 | zircon | F-T | Frizzell and others (1984) | |
| 041 | 3 (VF 82W-565 | 47°00.7' | 121°51.7' | Carbon River stock | 19.4 | 3.0 | hornblende | K/Ar | Frizzell and others (1984) | |
| 042 | | 47°00.7' | 121°51.7' | Carbon River stock | 17.1 | 0.4 | biotite | K/Ar | Frizzell and others (1984) | |
| 043 | JV 163 | 47°03.8' | 121°43.8' | Fifes Peak Fm. | 20.0 | 2.0 | zircon | F-T | Vance and others (1987) | |
| 044 | 20 | 47°03.2' | 121°34.1' | Stevens Ridge Fm. | 21.0 | 1.5 | plagioclase | K/Ar | Frizzell and others (1984) | Hartman (1973) p. 21 |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 029 | Lost Lake 7.5-min. | King | NW | 20 | 21 N. | 10 E. | |
| 030 | Sumner 7.5-min. | Pierce | SW SE | 18 | 20 N. | 5 E. | |
| 031 | Sumner 7.5-min. | Pierce | SE | 25 | 20 N. | 4 E. | probably downvalley facies of the Osceola mudflow |
| 032 | Greenwater 7.5-min. | Pierce | SE | 7 | 19 N. | 9 E. | probably too old |
| 033 | Greenwater 7.5-min. | Pierce | SE | 7 | 19 N. | 9 E. | |
| 034 | Clear West Peak 7.5-min. | Pierce | center | 21 | 19 N. | 9 E. | |
| 035 | Clear West Peak 7.5-min. | Pierce | center | 21 | 19 N. | 9 E. | |
| 036 | Kamilche Valley 7.5-min. | Grays Harbor | SW NW | 18 | 18 N. | 4 W. | |
| 037 | Summit Lake 7.5-min. | Thurston | NW NW | 14 | 18 N. | 3 W. | |
| 038 | Lake Kapowsin 7.5-min. | Pierce | SE | 32 | 18 N. | 5 E. | |
| 039 | Wilkeson 7.5-min. | Pierce | NE NE | 19 | 18 N. | 6 E. | |
| 040 | Old Baldy Mtn. 7.5-min. | Pierce | NE | 19 | 18 N. | 7 E. | |
| 041 | Bearhead Mtn. 7.5-min. | Pierce | W 1/2 | 36 | 18 N. | 7 E. | |
| 042 | Bearhead Mtn. 7.5-min. | Pierce | W 1/2 | 36 | 18 N. | 7 E. | |
| 043 | Clear West Peak 7.5-min. | Pierce | NE | 12 | 18 N. | 8 E. | intrusion? |
| 044 | Sun Top 7.5-min. | Pierce | S 1/2 | 8 | 18 N. | 10 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 045 | 21 | 47°03.2' | 121°34.1' | Stevens Ridge Fm. | 20.0 | 1.8 | plagioclase | K/Ar | Frizzell and others (1984) | Hartman (1973) p. 21 |
| 046 | JV 36 | 47°03' | 121°33.9' | Fifes Peak Fm., Sun Top tuff | 24.0 | 2.8 | zircon | F-T | Vance and others (1987) | |
| 047 | JV 165 | 47°02.4' | 121°35.7' | Fifes Peak Fm.; Sun Top tuff | 22.2 | +0.3/-0.5 | zircon | U/Pb | Vance and others (1987) | |
| 048 | JV 165 | 47°02.4' | 121°35.7' | Fifes Peak Fm., Sun Top tuff | 24.5 | 2.0 | zircon | F-T | Vance and others (1987) | |
| 049 | 18 (R-165) | 47°02.3' | 121°35.5' | Stevens Ridge Fm. | 22.0 | 0.5 | hornblende | K/Ar | Frizzell and others (1984) | |
| 050 | 71-21 | 47°00.9' | 121°42.3' | welded tuff at Clear West Peak | 22.6 | --- | zircon | U/Pb | Mattinson (1977) | Schasse (1987b) |
| 051 | 71-21 | 47°00.9' | 121°42.3' | welded tuff at Clear West Peak | 21.8 | --- | zircon | U/Pb | Mattinson (1977) | Schasse (1987b) |
| 052 | 77 | 47°01' | 121°42' | Tatoosh pluton - eruptive phase (rhyodacite) | 18.6 | 0.4 | whole rock | K/Ar | Engels and others (1976) | Hartman (1973) p. 30 |
| 053 | 76 (JM 71-21A) | 47°00.1' | 121°42.3' | Tatoosh pluton - eruptive phase (pyroclastic flow) | 22.6 | --- | zircon | U/Pb | Engels and others (1976) | Mattinson (1973), p. 494; Frizzell and others (1984) |
| 054 | D78-BH-19 | 46°57'40" | 123°14'00" | Crescent Fm. - volcanics | 51.9 | 2.3 | whole rock | K/Ar | Duncan (1982) | |
| 055 | D78-BH-18 | 46°57'40" | 123°10'00" | Crescent Fm. - volcanics | 53.3 | 1.3 | whole rock | K/Ar | Duncan (1982) | |
| 056 | D78-BH-23 | 46°52'52" | 123°13'35" | Crescent Fm. - volcanics | 51.4 | 4.0 | whole rock | K/Ar | Duncan (1982) | |
| 057 | K-AR 4 | 46°53'00" | 122°08'10" | basaltic andesite and andesite flows - upper Eocene to lower Oligocene | 35.5 | 1.6 | whole rock | K/Ar | Schasse (1987a) | |
| 058 | W-566 | 46°54' | 122°02' | mudflow | 2170 yrs. | 200 yrs. | log | C-14 | Rubin and Alexander (1960) | |
| 059 | JV 92 | 46°56.7' | 121°52.1' | Fifes Peak Fm. | 24.2 | 1.1 | zircon | F-T | Vance and others (1987) | |
| 060 | 86 | 46°57' | 121°53' | Fifes Peak Fm. | 16.7 | 4.3 | plagioclase | K/Ar | Engels and others (1976) | Hartman (1973) p. 24-28; Frizzell and others (1984) |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 045 | Sun Top 7.5-min. | Pierce | S 1/2 | 8 | 18 N. | 10 E. | |
| 046 | Sun Top 7.5-min. | Pierce | N 1/2 | 17 | 18 N. | 10 E. | |
| 047 | Sun Top 7.5-min. | Pierce | SW | 18 | 18 N. | 10 E. | |
| 048 | Sun Top 7.5-min. | Pierce | SW | 18 | 18 N. | 10 E. | |
| 049 | Sun Top 7.5-min. | Pierce | NW | 19 | 18 N. | 10 E. | |
| 050 | Clear West Peak 7.5-min. | Pierce | SE | 30 | 18 N. | 9 E. | two fractions of same sample yield two dates |
| 051 | Clear West Peak 7.5-min. | Pierce | SE | 30 | 18 N. | 9 E. | |
| 052 | Clear West Peak 7.5-min. | Pierce | NE SE | 30 | 18 N. | 9 E. | corrected date is 19.1 +/- 0.4 Ma after Dalrymple (1979) |
| 053 | Clear West Peak 7.5-min. | Pierce | SW NW | 32 | 18 N. | 9 E. | Frizzell and others (1984) corrected date after Dalrymple (1979); these authors called these rocks Fifes Peak Fm. |
| 054 | Capitol Peak 7.5-min. | Grays Harbor | NE SW | 18 | 17 N. | 4 W. | |
| 055 | Capitol Peak 7.5-min. | Grays Harbor | SW NE | 15 | 17 N. | 4 W. | |
| 056 | Capitol Peak 7.5-min. | Grays Harbor | SE SE | 7 | 16 N. | 4 W. | |
| 057 | Lake Kapowsin 7.5-min. | Pierce | center | 11 | 16 N. | 5 E. | |
| 058 | Le Dout Creek 7.5-min. | Pierce | NE | 3 | 16 N. | 6 E. | |
| 059 | Mowish Lake 7.5-min. | Pierce | NW | 24 | 17 N. | 7 E. | at Mowich Lake |
| 060 | Golden Lakes 7.5-min. | Pierce | center | 26 | 17 N. | 7 E. | Frizzell and others (1984) recalculated the age to 17.1 +/- 4.3 Ma after Dalrymple (1979) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 061 | | 46°57' | 121°53' | Flfes Peak Fm. | 20.3 | 2.6 | plagioclase | K/Ar | Engels and others (1984) | Hartman (1973) p. 24-28; Frizzell and others (1984) |
| 062 | 87 | 46°57' | 121°53' | Flfes Peak Fm. | 21.7 | 1.9 | whole rock | K/Ar | Engels and others (1976) | Hartman (1973) p. 24-28; Frizzell and others (1984) |
| 063 | | 46°57' | 121°53' | Flfes Peak Fm. | 23.4 | 1.4 | whole rock | K/Ar | Engels and others (1976) | Hartman (1973) p. 24-28; Frizzell and others (1984) |
| 064 | 78 (JM 71-16) | 46°56'54" | 121°35'6" | The Palisades welded tuff | 25.3 | --- | zircon | U/Pb | Engels and others (1976) | |
| 065 | 71-16 | 46°56.9' | 121°36.1' | The Palisades welded tuff | 25.1 | --- | zircon | U/Pb | Mattinson (1977) | Schasse (1987b) |
| 066 | 79 (JM 71-15) | 46°55'6" | 121°35'6" | Tatoosh pluton (roof phase) | 24.3 | --- | zircon | U/Pb | Engels and others (1976) | Hartman (1973) p. 30 |
| 067 | 71-15 | 46°55.1' | 121°35.2' | Tatoosh pluton, roof zone | 24.1 | --- | zircon | U/Pb | Mattinson (1977) | |
| 068 | 80 (G-155) | 46°53'36" | 121°36'54" | Tatoosh pluton (granodiorite) | 62 | --- | zircon | Pb-alpha | Engels and others (1976) | Jaffe and others (1959) p. 82 |
| 069 | 81 (JM 71-14) | 46°53'36" | 121°36'54" | Tatoosh pluton (granodiorite) | 14.2 | --- | zircon | U/Pb | Engels and others (1976) | Mattinson (1973) p. 494 |
| 070 | 82 (AK429) | 46°53'36" | 121°36'54" | Tatoosh pluton (granodiorite) | 13 | 1 | biotite | K/Ar | Engels and others (1976) | Fiske and others (1963) p. 63; Baadsgaard and others (1964) |
| 071 | 71-14 | 46°53.7' | 121°36.7' | Tatoosh pluton core | 14.1 | --- | zircon | U/Pb | Mattinson (1977) | Schasse (1987b) |
| 072 | | 46°53.7' | 121°36.7' | Tatoosh pluton core, White River valley | 13 | 1 | biotite | K/Ar | Fiske and others (1963) | Mattinson (1977) |
| 073 | 83 (JM 71-13) | 46°52'6" | 121°31'24" | Tatoosh sill (granophyre) | 26.1 | --- | zircon | U/Pb | Engels and others (1976) | Mattinson (1973) p. 494 |
| 074 | 71-13 | 46°52.1' | 121°31.5' | sill (18-m-thick) in Ohanapecosh Fm. | 25.8 | --- | zircon | U/Pb | Mattinson (1977) | Schasse (1987b) |
| 075 | W-558 | 46°37' | 123°59' | till overlain by oyster bed overlain by Columbia River terrace | >35,000 | --- | wood | C-14 | Rubin and Alexander (1960) | |
| 076 | D78-GR-1 | 46°31'50" | 123°49'35" | Grays River Volcanics | 48.4 | 1.2 | whole rock | K/Ar | Duncan (1982) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 061 | Golden Lakes 7.5-min. | Pierce | center | 26 | 17 N. | 7 E. | NW flank of Mt. Rainier; Frizzell and others (1984) recalculated age to 20.8 +/- 2.6 Ma after Dalrymple (1979) |
| 062 | Golden Lakes 7.5-min. | Pierce | center | 26 | 17 N. | 7 E. | NW flank of Mt. Rainier; Frizzell and others (1984) recalculated age to 22.3 +/- 1.9 Ma after Dalrymple (1979) |
| 063 | Golden Lakes 7.5-min. | Pierce | center | 26 | 17 N. | 7 E. | NW flank of Mt. Rainier; Frizzell and others (1984) recalculated age as 24.0 +/- 1.4 Ma after Dalrymple (1979) |
| 064 | White River Park 7.5-min. | Pierce | NE NE | 24 | 17 N. | 9 E. | NE flank of Mt. Rainier |
| 065 | White River Park 7.5-min. | Pierce | NE NE | 24 | 17 N. | 9 E. | |
| 066 | White River Park 7.5-min. | Pierce | SW NE | 31 | 17 N. | 10 E. | |
| 067 | White River Park 7.5-min. | Pierce | SW NE | 31 | 17 N. | 10 E. | |
| 068 | White River Park 7.5-min. | Pierce | NE NE | 7 | 16 N. | 10 E. | suspect age |
| 069 | White River Park 7.5-min. | Pierce | NE NE | 7 | 16 N. | 10 E. | core of pluton |
| 070 | White River Pass 7.5-min. | Pierce | NE NE | 7 | 16 N. | 10 E. | corrected date is 13.3 +/- 1 Ma after Dalrymple (1979) |
| 071 | White River Park 7.5-min. | Pierce | NE NE | 7 | 16 N. | 10 E. | White River valley |
| 072 | White River Park 7.5-min. | Pierce | NE NE | 7 | 16 N. | 10 E. | this locality resampled by Mattinson (1977); corrected date is 13.3 +/- 1 Ma after Dalrymple (1979) |
| 073 | Chinook Pass 7.5-min. | Pierce | NW | 23 | 16 N. | 10 E. | Chinook Pass |
| 074 | Chinook Pass 7.5-min. | Pierce | NW | 23 | 16 N. | 10 E. | |
| 075 | Nemah 7.5-min. | Pacific | SW | 8 | 13 N. | 10 W. | locality uncertain |
| 076 | North Nemah 7.5-min. | Pacific | NE NE | 18 | 12 N. | 9 W. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 077 | D78-GR-2 | 46°32'08" | 123°46'30" | Grays River Volcanics | 52.3 | 12.1 | whole rock | K/Ar | Duncan (1982) | |
| 078 | D78-GR-4 | 46°34'25" | 123°42'10" | Grays River Volcanics | 46.7 | 1.8 | whole rock | K/Ar | Duncan (1982) | |
| 079 | KA 2138 | 46°37'45" | 123°16'40" | Grande Ronde Basalt, Columbia River Basalt Group | 15.3 | 0.8 | whole rock | K/Ar | Turner (1970) | Snavely and others (1973) |
| 080 | K-AR 3 | 46°47'42" | 122°12'50" | basaltic andesite and andesite flows - upper Eocene to lower Oligocene | 32.7 | 1.5 | whole rock | K/Ar | Schasse (1987a) | |
| 081 | K-AR 1 (HS0612851) | 46°45'53" | 122°11'09" | andesite flows - lower Miocene | 20.7 | 0.3 | whole rock | K/Ar | Schasse (1987a) | Phillips and others (1986) |
| 082 | K-AR 2 | 46°41'50" | 122°16'55" | andesite flows - lower Miocene | 23.2 | 1.7 | whole rock | K/Ar | Schasse (1987a) | |
| 083 | 90 | 47°03' | 121°34' | Stevens Ridge Fm. | 20.5 | 1.5 | plagioclase | K/Ar | Engels and others (1976) | Hartman (1973) p. 21 |
| 084 | | 47°03' | 121°34' | Stevens Ridge Fm. | 19.5 | 1.8 | plagioclase | K/Ar | Engels and others (1976) | Hartman (1973) p. 21 |
| 085 | W-925 | 46°47' | 121°48' | buried forest - Kautz Creek | 350 yrs. | 250 yrs. | wood | C-14 | Rubin and Berthold (1961) | |
| 086 | W-926 | 46°47' | 121°48' | stump rooted in mudflow - Kautz Creek | 350 yrs. | 250 yrs. | log | C-14 | Rubin and Berthold (1961) | |
| 087 | CC0827851 | 46°43'40" | 121°47'43" | lower Miocene olivine(?) basalt flow | 19.1 | 1.4 | whole rock | K/Ar | Phillips and others (1986) | Schasse (1987b) |
| 088 | 84 (JM 71-18) | 46°46'54" | 121°45'48" | Tatoosh pluton (granodiorite) | 17.1 | --- | zircon | U/Pb | Engels and others (1976) | Mattinson (1973) p. 494 |
| 089 | 85 (AK 398) | 46°46'54" | 121°45'48" | Tatoosh pluton (granodiorite) | 14.7 | 1 | biotite | K/Ar | Engels and others (1976) | Fiske and others (1963) p. 63 |
| 090 | W-922 | 46°47' | 121°45' | tuff at top of yellow pumice | 1640 yrs. | 250 yrs. | wood | C-14 | Rubin and Berthold (1961) | |
| 091 | Av. F | 46°50' | 121°45' | Tatoosh pluton, Nisqually valley | 18.04 | 0.53 | hornblende | K/Ar | Bikerman and Robison (1978) | |
| 092 | | 46°50' | 121°45' | Tatoosh pluton, Nisqually valley | 16.2 | 0.14 | biotite | K/Ar | Bikerman and Robison (1978) | |

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| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 077 | North Nemah 7.5-min. | Pacific | center | 10 | 12 N. | 9 W. | |
| 078 | Menlo 7.5-min. | Pacific | SW NE | 32 | 13 N. | 8 W. | |
| 079 | Doty 7.5-min. | Lewis | SW NW | 11 | 13 N. | 5 W. | quarry on east side of road between Doty and Pe Ell; corrected date is 15.7 +/- 0.8 Ma after Dalrymple (1979); Snavely and others (1973) called this Depoe Bay Basalt. |
| 080 | Elbe 7.5-min. | Pierce | SE SE | 7 | 15 N. | 5 E. | |
| 081 | Elbe 7.5-min. | Pierce | SE SW | 21 | 15 N. | 5 E. | |
| 082 | The Rockies 7.5-min. | Lewis | NW SE | 15 | 14 N. | 4 E. | |
| 083 | Mt. Rainier West 7.5-min. | Pierce | NE | 8 | 15 N. | 8 E. | SW flank of Mt. Rainier; corrected date is 21.0 +/- 1.5 Ma after Dalrymple (1979) |
| 084 | Mt. Rainier West 7.5-min. | Pierce | NE | 8 | 15 N. | 8 E. | SW flank of Mt. Rainier; corrected date is 20.0 +/- 1.8 Ma after Dalrymple (1979) |
| 085 | Mt. Rainier West 7.5-min. | Pierce | NE NW | 21 | 15 N. | 8 E. | |
| 086 | Mt. Rainier West 7.5-min. | Pierce | NE NW | 21 | 15 N. | 8 E. | |
| 087 | Wahpenayo Peak 7.5-min. | Lewis | NE SE | 4 | 14 N. | 8 E. | |
| 088 | Mt. Rainier West 7.5-min. | Pierce/Lewis | center | 14 | 15 N. | 8 E. | core of pluton; Mattinson (1973) resampled Fiske and others (1963) locality |
| 089 | Mt. Rainier West 7.5-min. | Pierce/Lewis | center | 14 | 15 N. | 8 E. | core of pluton; corrected date is 15.1 +/- 1 Ma after Dalrymple (1979) |
| 090 | Mt. Rainier West 7.5-min. | Pierce/Lewis | E 1/2 | 14 | 15 N. | 8 E. | |
| 091 | Mt. Rainier West 7.5-min. | Pierce | NE | 35 | 16 N. | 8 E. | location uncertain |
| 092 | Mt. Rainier West 7.5-min. | Pierce | NE | 35 | 16 N. | 8 E. | location uncertain |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 093 | JV 3 | 46°48.8' | 121°37.1' | Ohanapecosh Fm. - upper; rhyolite flows | 30.4 | 3.0 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 094 | JV 67 | 46°39.9' | 121°35.6' | Stevens Ridge Fm. - basal; ash flow tuff | 24.8 | 0.3 | zircon | U/Pb | Vance and others (1987) | Schasse (1987b) |
| 095 | JV 67 | 46°39.9' | 121°35.6' | Stevens Ridge Fm. - basal; ash flow tuff | 26.5 | 2.1 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 096 | JV 32 | 46°42.7' | 121°35.6' | Stevens Ridge Fm. - basal; ash flow tuff | 27.3 | 2.9 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 097 | JV 269 | 46°43.4' | 121°35.2' | Ohanapecosh Fm. - upper; ash flow tuff | 28.5 | 3.0 | zircon | F-T | Vance and others (1987) | |
| 098 | JV 124 | 46°43.4 | 121°35.2' | Ohanapecosh Fm. - upper; ash flow tuff | 28.3 | 2.9 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 099 | JV 125 | 46°42.3' | 121°31' | Ohanapecosh Fm. - lower | 36.5 | 3.1 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 100 | JV 126 | 46°41.5' | 121°31.3' | Ohanapecosh Fm. - lower | 36.4 | 3.6 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 101 | JV 94B | 46°40.3' | 121°30.8' | Ohanapecosh Fm. | 35.5 | 3.6 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 102 | JV 229 | 46°40.9' | 121°29.9' | Eocene laminated quartz-phyric welded tuff(?) - upper part of basalt of Summit Creek | 44.0 | 3.9 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 103 | JV 232 | 46°41.4' | 121°29.5' | Eocene laminated crystal-poor welded tuff(?) | 46.1 | 2.7 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 104 | JV 310 | 46°40.9' | 121°27.6' | Eocene quartz-phyric lapilli tuff near base of basalt of Summit Creek | 55 | 3 | zircon | U/Pb | Vance and others (1987) | Schasse (1987b) |
| 105 | PL-2 | 46°43'00" | 121°24'38" | basalt | 1.75 | 0.35 | whole rock | K/Ar | Clayton (1983) | |
| 106 | PL-4 | 46°43'00" | 121°24'18" | pyroxene andesite | 1.06 | 0.18 | whole rock | K/Ar | Clayton (1983) | |
| 107 | SF CCF | 46°38'48" | 121°22'25" | basaltic andesite | 0.65 | 0.08 | whole rock | K/Ar | Clayton (1983) | |
| 108 | HS0116853 (K-AR 8) | 46°37'33" | 122°37'50" | Northcraft Fm. | 38.8 | 1.9 | whole rock | K/Ar | Phillips and others (1986) | Schasse (1987a) |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 093 | Chinook Pass 7.5-min. | Pierce | SE | 1 | 15 N. | 9 E. | |
| 094 | Ohanapecosh Hot Springs 7.5-min. | Lewis | NE | 31 | 14 N. | 10 E. | |
| 095 | Ohanapecosh Hot Springs 7.5-min. | Lewis | NE | 31 | 14 N. | 10 E. | |
| 096 | Ohanapecosh Hot Springs 7.5-min. | Lewis | SE SE | 7 | 14 N. | 10 E. | |
| 097 | Ohanapecosh Hot Springs 7.5-min. | Lewis | NW | 8 | 14 N. | 10 E. | |
| 098 | Ohanapecosh Hot Springs 7.5-min. | Lewis | NW | 8 | 14 N. | 10 E. | |
| 099 | Ohanapecosh Hot Springs 7.5-min. | Lewis | center | 14 | 14 N. | 10 E. | |
| 100 | Ohanapecosh Hot Springs 7.5-min. | Lewis | center | 23 | 14 N. | 10 E. | |
| 101 | Ohanapecosh Hot Springs 7.5-min. | Lewis | SE | 26 | 14 N. | 10 E. | |
| 102 | White Pass 7.5-min. | Lewis | NE | 25 | 14 N. | 10 E. | correlative to Puget Group and Naches Fm. |
| 103 | White Pass 7.5-min. | Lewis | E 1/2 | 24 | 14 N. | 10 E. | correlative to Puget Group and Naches Fm. |
| 104 | White Pass 7.5-min. | Lewis | NW | 29 | 14 N. | 11 E. | correlative to Puget Group and Naches Fm. |
| 105 | White Pass 7.5-min. | Lewis | SE | 10 | 14 N. | 11 E. | |
| 106 | White Pass 7.5-min. | Lewis | SE | 10 | 14 N. | 11 E. | |
| 107 | Spiral Butte 7.5-min. | Yakima | SW | 1 | 13 N. | 11 E. | |
| 108 | Onalaska NW 7.5-min. | Lewis | NE NE | 18 | 13 N. | 3 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 109 | K-AR 9 | 46°37'28" | 122°15'32" | andesite or andesite porphyry intrusion | 33.3 | 1.7 | whole rock | K/Ar | Schasse (1987a) | |
| 110 | HS0117851A (K-AR 7) | 46°34'15" | 122°18'50" | Northcraft Fm. | 38.3 | 1.9 | whole rock | K/Ar | Phillips and others (1986) | Schasse (1987a) |
| 111 | K-AR 5 | 46°33'28" | 122°13'35" | basaltic andesite and andesite flows - upper Eocene to lower Oligocene | 35.8 | 1.7 | whole rock | K/Ar | Schasse (1987a) | |
| 112 | K-AR 6 | 46°33'30" | 122°02'27" | andesite flows - Oligocene (=? Ohanapecosh) | 27.0 | 1.8 | whole rock | K/Ar | Schasse (1987a) | |
| 113 | MK85817 | 46°32'11" | 121°57'36" | lower Miocene plagioclase-clinopyroxene phyric andesite flow | 16.1 | 1.8 | whole rock | K/Ar | Phillips and others (1986) | Schasse (1987b) |
| 114 | FZ1 | 46°37'00" | 121°40'00" | Stevens Ridge Fm.(?) - tuff bed | 23.5 | 0.6 | zircon | F-T | Schasse (1987b) | |
| 115 | TRG 2 | 46°32.1' | 121°23.6' | Eocene quartz-phyric vitric tuff just above basalt at Tieton Pass | 42.4 | 3.7 | zircon | F-T | Vance and others (1987) | Schasse (1987b) |
| 116 | S82-A3-E32 | 46°23'45" | 122°14'20" | andesite porphyry (upper Oligocene to lower Miocene) | 35.0 | 2.0 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 117 | S82-A3-E32 | 46°23'45" | 122°14'20" | andesite porphyry (upper Oligocene to lower Miocene) | 28.5 | 1.1 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 118 | S78-B2-E49A | 46°24'45" | 122°09'15" | pyroxene andesite | 24.7 | 3.5 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 119 | S78-A1-E209A | 46°27'05" | 122°13'32" | hornblende andesite (upper Oligocene to lower Miocene) | 27.1 | 2.0 | hornblende | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 120 | S80-A1-S02 | 46°28'00" | 122°13'15" | dacitic ash flow tuff (upper Oligocene to lower Miocene) | 28.5 | 0.9 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 121 | K-AR 34 (BP0516851) | 46°29'07" | 122°10'52" | basalt flows (upper Oligocene to lower Miocene) | 24.4 | 1.4 | whole rock | K/Ar | Phillips (1987a) | Phillips and others (1986) |
| 122 | S77-D3-R12 | 46°23'15" | 122°02'15" | pyroxene andesite | 22.6 | 0.7 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 123a | S82-D1-E106 | 46°28'35" | 122°00'02" | basalt | 23.6 | 1.2 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 123b | S82-D1-E106 | 46°28'35" | 122°00'02" | basalt | 23.2 | 0.7 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 109 | Morton 7.5-min. | Lewis | NE SE | 11 | 13 N. | 4 E. | |
| 110 | Morton 7.5-min. | Lewis | SE NW | 33 | 13 N. | 4 E. | |
| 111 | Glenoma 7.5-min. | Lewis | SE NW | 5 | 12 N. | 5 E. | |
| 112 | Kiona Peak 7.5-min. | Lewis | SE NW | 3 | 12 N. | 6 E. | |
| 113 | Randall 7.5-min. | Lewis | SE SW | 8 | 12 N. | 7 E. | |
| 114 | Packwood 7.5-min. | Lewis | NE SW | 15 | 13 N. | 9 E. | |
| 115 | Old Snowy Mtn. 7.5-min. | Yakima | S 1/2 | 11 | 12 N. | 11 E. | North Fork of Tieton River; correlative to Puget Group and Naches Fm. |
| 116 | Vanson Peak 7.5-min. | Lewis | SW NW | 31 | 11 N. | 5 E. | Evarts and others (1987) note that this is an anomalously old age. Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene basalt flows. |
| 117 | Vanson Peak 7.5-min. | Lewis | SW NW | 31 | 11 N. | 5 E. | Evarts and others (1987) note that this date seems more reasonable based on geologic relationships. Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene basalt flows. |
| 118 | Vanson Peak 7.5-min. | Lewis | NW NW | 26 | 11 N. | 5 E. | Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene basaltic andesite flows. |
| 119 | Vanson Peak 7.5-min. | Lewis | NE SE | 7 | 11 N. | 5 E. | Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene volcaniclastic rocks. |
| 120 | Vanson Peak 7.5-min. | Lewis | NE SE | 6 | 11 N. | 5 E. | Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene volcaniclastic rocks. |
| 121 | Vanson Peak 7.5-min. | Lewis | NE NE | 33 | 12 N. | 5 E. | east end of Davisson Lake |
| 122 | Cowlitz Falls 7.5-min. | Lewis | NW NE | 3 | 10 N. | 6 E. | Evarts and others (1987) note that this is a minimum age, partially reset by the Spirit Lake pluton. Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene basaltic andesite flows. |
| 123a | Cowlitz Falls 7.5-min. | Lewis | NE NW | 1 | 11 N. | 6 E. | Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene basalt flows. |
| 123b | Cowlitz Falls 7.5-min. | Lewis | NE NW | 1 | 11 N. | 6 E. | Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene basalt flows. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 124 | 17 (MK85-6-35) | 46°25'25" | 121°55'13" | dacite flow at Iron Creek Butte | 15.65 | 0.2 | whole rock | K/Ar | Korosec (1987a) | Phillips and others (1986) |
| 125 | MK8578 | 46°28'33" | 121°51'37" | Lower to middle Miocene andesite and basaltic andesite lava flows | 22.1 | 1.3 | whole rock | K/Ar | Phillips and others (1986) | |
| 126 | W-3133 | 46°24' | 121°48' | above tephra set S | 12,120 yrs. | 100 yrs. | peat | C-14 | Crandell and others (1981) | |
| 127a | D78-GR-5 | 46°44'32" | 123°46'22" | Grays River Volcanics | 48.3 | 1.3 | whole rock | K/Ar | Duncan (1982) | |
| 127b | D78-GR-5 | 46°44'32" | 123°46'22" | Grays River Volcanics | 48.1 | 1.0 | whole rock | Ar/Ar | Duncan (1982) | |
| 128 | K-AR 1 (BP0604851) | 46°19'10" | 122°54'34" | Grays River Volcanics | 37.3 | 2.2 | whole rock | K/Ar | Phillips (1987a) | Phillips and others (1986) |
| 129 | K-AR 2 | 46°21'03" | 122°48'42" | Goble Volcanics - basaltic andesite flow | 35.3 | 0.5 | plagioclase | K/Ar | Phillips (1987a) | Armentrout and others (1980) |
| 130 | W-811 | 46°18' | 122°44' | upper 1 ft of mudflow or debris flow along Toutle River | 2030 yrs. | 240 yrs. | charred fragments | C-14 | Rubin and Alexander (1960) | |
| 131 | FS-1 | 46°26'06" | 122°40'15" | Toutle Formation - pumiceous lapilli tuff bed | 8.3 | 1.7 | apatite | F-T | May (1980) | |
| 132 | #4338 | 46°02'10" | 122°51'21" | Goble Volcanics | 37.4 | 0.7 | whole rock | K/Ar | Armentrout and others (1980) | |
| 133 | W-2875 | 46°21' | 122°33' | buried soil between lahars | 2900 yrs. | 70 yrs. | carbonized wood | C-14 | Crandell and others (1981) | |
| 134 | K-AR 6A | 46°22'48" | 122°37'48" | Goble Volcanics - basaltic andesite flow | 32.2 | 0.3 | whole rock | K/Ar | Beck and Burr (1979); sample no. 77-07B | Phillips (1987a); Armentrout and others (1980) |
| 135 | K-AR 6B | 46°22'48" | 122°37'48" | Goble Volcanics - basaltic andesite flow | 35.9 | 0.4 | whole rock | K/Ar | Beck and Burr (1979); sample no. 77-07B | Phillips (1987a); Armentrout and others (1980) |
| 136 | K-AR 10 | 46°21'44" | 122°17'31" | andesite flow (lower Oligocene) | 35.7 | 1.6 | whole rock | K/Ar | Phillips (1987a) | |
| 137 | S79-A4-R128 | 46°20'55" | 122°12'06" | granodiorite | 21.1 | 0.6 | biotite | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 138 | K-AR 23 | 46°19'48" | 122°12'12" | Spirit Lake pluton (quartz diorite) | 21.4 | 0.3 | hornblende | K/Ar | Phillips (1987a) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 124 | Greenhorn Buttes 7.5-min. | Lewis | NE SW | 22 | 11 N. | 7 E. | |
| 125 | Tower Rock 7.5-min. | Lewis | NW NW | 6 | 11 N. | 8 E. | |
| 126 | Tower Rock 7.5-min. | Lewis | NE | 33 | 11 N. | 8 E. | |
| 127a | South Bend 7.5-min. | Pacific | NW SW | 35 | 15 N. | 9 W. | |
| 127b | South Bend 7.5-min. | Pacific | NW SW | 35 | 15 N. | 9 W. | |
| 128 | Castle Rock 7.5-min | Cowlitz | SE | 27 | 10 N. | 2 W. | |
| 129 | Silver Lake 7.5-min. | Cowlitz | NE SW | 16 | 10 N. | 1 W. | |
| 130 | Toutle 7.5-min. | Cowlitz | SW NE | 30 | 10 N. | 1 E. | stem and lateral limb of conifer |
| 131 | Eden Valley 7.5-min. | Lewis | NE SW | 15 | 11 N. | 1 E. | suspect age, probably too young (May, 1980). Tuff bed overlies Cedar Creek No. 1 lignite bed in Windom Mine, Shives Strip Pit No. 2. |
| 132 | Kalama 7.5-min. | Cowlitz | SW NE | 6 | 6 N. | 1 W. | |
| 133 | Toutle Mtn. 7.5-min. | Cowlitz | SW | 15 | 10 N. | 2 E. | corrected date is either about 1130 or 1210 B.C. |
| 134 | Eden Valley 7.5-min. | Cowlitz | center | 1 | 10 N. | 2 E. | |
| 135 | Eden Valley 7.5-min. | Cowlitz | center | 1 | 10 N. | 2 E. | |
| 136 | Elk Rock 7.5-min. | Cowlitz | SE NW | 10 | 10 N. | 4 E. | |
| 137 | Spirit Lake West 7.5-min. | Skamania | NE | 17 | 10 N. | 5 E. | Phillips (1987a) mapped these rocks as quartz diorite of the Spirit Lake pluton. |
| 138 | Spirit Lake West 7.5-min. | Skamania | NE SE | 20 | 10 N. | 5 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 139 | K-AR 32a | 46°21' | 122°05' | Spirit Lake pluton - Earl porphyry copper deposit | 16.2 | 0.6 | biotite | K/Ar | Phillips (1987a) | |
| 140 | MDH7 684/687 | 46°21'25" | 122°04'52" | Earl porphyry copper deposit (altered granodiorite) | 16.9 | 0.5 | sericite | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 141 | W-3911 | 46°22' | 122°03.5' | immediately below tephra set Y | 3850 yrs. | 70 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 142 | 19 | 46°22'44" | 121°54'26" | pyroclastic flow at Greenhorn Buttes | 18.9 | 0.3 | plagioclase | K/Ar | Korosec (1987a) | Hammond (1980) |
| 143 | 19 | 46°22'44" | 121°54'26" | pyroclastic flow at Greenhorn Buttes | 18.4 | 0.3 | plagioclase | K/Ar | Korosec (1987a) | Hammond (1980) |
| 144 | 25 | 46°22'13" | 121°47'39" | McCoy Creek quartz diorite | 24.0 | 0.9 | sericite | K/Ar | Korosec (1987a) | Armstrong and others (1976) |
| 145 | 16 | 46°21'34" | 121°32'41" | Midway tuff | 3.6 | 0.4 | plagioclase | K/Ar | Korosec (1987a) | Hammond (1980) |
| 146 | --- | 46°21'34" | 121°32'41" | Midway tuff | 3.7 | 0.4 | plagioclase | K/Ar | Korosec (1987a) | Hammond (1980) |
| 147 | 07 (05) | 46°23'11" | 121°31'58" | basalt of Two Lakes | 0.35 | 0.06 | whole rock | K/Ar | Korosec (1987a) | Hammond and Korosec (1983) |
| 148 | S80-A4-R06 | 46°19'04" | 122°12'02" | granodiorite | 20.8 | 0.6 | biotite | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 149 | S80-A4-R08 | 46°18'43" | 122°12'08" | granodiorite | 22.2 | 0.7 | biotite | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 150 | 18 | 46°19'33" | 121°58'38" | Iron Creek dacite tuff | 18 | --- | plagioclase | K/Ar | Korosec (1987a) | |
| 151 | K-AR 7 (MK8589) | 46°17'21" | 122°33'11" | andesite flow (lower Oligocene) | 33.9 | 1.7 | whole rock | K/Ar | Phillips (1987a) | Phillips and others (1986) |
| 152 | W-3263 | 46°14' | 122°25' | lahar | 700 yrs. | 60 yrs. | wood | C-14 | Crandell and others (1981) | |
| 153 | W-2923 | 46°15' | 122°15' | pumiceous pyroclastic-flow deposit | 2200 yrs. | 60 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 154 | S81-A5-R48 | 46°16'11" | 122°13'44" | basaltic andesite | 27.7 | 3.7 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 139 | Spirit Lake East 7.5-min | Skamania | center | 17 | 10 N. | 6 E. | |
| 140 | Spirit Lake East 7.5-min. | Skamania | center | 17 | 10 N. | 6 E. | |
| 141 | Spirit Lake East 7.5-min. | Skamania | SE | 9 | 10 N. | 6 E. | |
| 142 | Spirit Lake West 7.5-min. | Skamania | SE SE | 3 | 10 N. | 7 E. | |
| 143 | Spirit Lake West 7.5-min. | Skamania | SE SE | 3 | 10 N. | 7 E. | |
| 144 | McCoy Peak 7.5-min. | Skamania | NE SW | 10 | 10 N. | 8 E. | |
| 145 | Green Mtn. 7.5-min. | Skamania | NW NE | 15 | 10 N. | 10 E. | |
| 146 | Green Mtn. 7.5-min. | Skamania | NW NE | 15 | 10 N. | 10 E. | |
| 147 | Green Mountain 7.5-min. | Yakima | SW NE | 2 | 10 N. | 10 E. | |
| 148 | Spirit Lake West 7.5-min. | Skamania | NE SE | 29 | 10 N. | 5 E. | Phillips (1987a) mapped these rocks as quartz diorite of the Spirit Lake pluton. |
| 149 | Spirit Lake West 7.5-min. | Skamania | NW N‰ | 32 | 10 N. | 5 E. | Phillips (1987a) mapped these rocks as quartz diorite of the Spirit Lake pluton. |
| 150 | French Butte 7.5-min. | Skamania | NW SE | 31 | 10 N. | 7 E. | |
| 151 | Toutle Mtn. 7.5-min. | Cowlitz | NE SE | 4 | 9 N. | 2 E. | Signal Peak |
| 152 | Elk Mountain 7.5-min. | Cowlitz | SW SW | 27 | 9 N. | 3 E. | |
| 153 | Goat Mountain 7.5-min. | Cowlitz | NW | 24 | 9 N. | 4 E. | corrected date by tree-ring calibration curve of Suess (1970) is either about 240, 300, or 420 B.C. (Crandell and others, 1981) |
| 154 | Spirit Lake West 7.5-min. | Skamania | NW NW | 18 | 9 N. | 5 E. | Phillips (1987a) mapped these rocks as upper Oligocene and lower Miocene andesite flows. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 155 | W-3991 | 46°15' | 122°10' | lahar | 275 yrs. | 60 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 156 | S81-B5-E43 | 46°15'05" | 122°08'33" | quartz diorite sill | 24.3 | 1.3 | hornblende | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 157 | S78-C5-E123A | 46°17'23" | 122°05'28" | hornblende andesite | 19.9 | 0.7 | hornblende | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 158 | S78-D5-E199A | 46°15'23" | 122°03'43" | vitrophyric welded tuff | 24.3 | 0.9 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 159 | S78-D5-E199A | 46°15'23" | 122°03'43" | vitrophyric welded tuff | 23.8 | 0.8 | plagioclase | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 160 | S78-D5-E168A | 46°16'06" | 122°02'50" | pyroxene andesite sill | 8.7 | 0.3 | whole rock | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 161 | S78-D5-M88A | 46°15'07" | 122°09'55" | andesite dike | 9.3 | 0.3 | whole rock | K/Ar | Evarts and others (1987) | Phillips (1987a) |
| 162 | MK85627 | 46°15'05" | 121°41'15" | lower to middle Miocene andesite and basaltic andesite lava flows | 25.5 | 0.4 | whole rock | K/Ar | Phillips and others (1986) | |
| 163 | 21 | 46°17'35" | 121°39'08" | East Canyon tuff | 19.4 | 1.0 | plagioclase | K/Ar | Korosec (1987a) | Hammond (1980) |
| 164 | 21 | 46°17'35" | 121°39'08" | East Canyon tuff | 20.0 | 1.0 | plagioclase | K/Ar | Korosec (1987a) | Hammond (1980) |
| 165 | 10 | 46°17'30" | 121°37'24" | dacite of Olallie Lake | 0.46 | 0.02 | whole rock | K/Ar | Korosec (1987a) | Hildreth and others (1983) |
| 166 | --- | 46°17'30" | 121°37'24" | dacite of Olallie Lake | 0.47 | 0.04 | whole rock | K/Ar | Korosec (1987a) | Hildreth and others (1983) |
| 167 | 04 | 46°15'15" | 121°35'48" | Mt. Adams andesite | 0.23 | 0.07 | whole rock | K/Ar | Korosec (1987a) | Armstrong and others (1976) |
| 168 | --- | 46°15'15" | 121°35'48" | Mt. Adams andesite | 0.21 | 0.05 | whole rock | K/Ar | Korosec (1987a) | Armstrong and others (1976) |
| 169 | W-3150 | 46°14' | 122°15' | pumiceous pyroclastic-flow deposit | 350 yrs. | 60 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 170 | W-2977 | 46°13' | 122°14'35" | pumiceous pyroclastic-flow deposit | 2060 yrs. | 50 yrs. | charcoal | C-14 | Crandell and others (1981) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 155 | Spirit Lake West 7.5-min. | Skamania | SE NE | 16 | 9 N. | 5 E. | |
| 156 | Spirit Lake West 7.5-min. | Skamania | NE | 23 | 9 N. | 5 E. | Phillips (1987a) mapped these rocks as granodiorite of the Spirit Lake pluton. |
| 157 | Spirit Lake East 7.5-min. | Skamania | NE SE | 6 | 9 N. | 6 E. | Evarts and others (1987) note that this dike cuts the contact aureole of the Spirit Lake pluton. |
| 158 | Spirit Lake East 7.5-min. | Skamania | SW SE | 16 | 9 N. | 6 E. | Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene volcaniclastic rocks. |
| 159 | Spirit Lake East 7.5-min. | Skamania | SW SE | 16 | 9 N. | 6 E. | Phillips (1987a) mapped these rocks as upper Oligocene to lower Miocene volcaniclastic rocks. |
| 160 | Spirit Lake East 7.5-min. | Skamania | NW NW | 15 | 9 N. | 6 E. | |
| 161 | Spirit Lake West 7.5-min. | Skamania | NW NW | 22 | 9 N. | 6 E. | |
| 162 | East Canyon Ridge 7.5-min. | Skamania | NW | 21 | 9 N. | 9 E. | |
| 163 | East Canyon Ridge 7.5-min. | Skamania | SW SE | 2 | 9 N. | 9 E. | |
| 164 | East Canyon Ridge 7.5-min. | Skamania | SW SE | 2 | 9 N. | 9 E. | |
| 165 | Green Mtn. 7.5-min. | Skamania | SW SW | 6 | 9 N. | 10 E. | |
| 166 | Green Mtn. 7.5-min. | Skamania | SW SW | 6 | 9 N. | 10 E. | |
| 167 | Green Mountain 7.5-min. | Skamania | SE NW | 20 | 9 N. | 10 E. | NW flank of Mt. Adams |
| 168 | Green Mountain 7.5-min. | Skamania | SE NW | 20 | 9 N. | 10 E. | NW flank of Mt. Adams |
| 169 | Goat Mountain 7.5-min. | Cowlitz | SW NE | 25 | 9 N. | 4 E. | |
| 170 | Mt. St. Helens 7.5-min. | Skamania | SW SW | 31 | 9 N. | 5 E. | corrected date by tree-ring calibration curve of Suess (1970) is either about A.D. 50 or 70 B.C. (Crandell and others, 1981) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 171 | W-3986 | 46°14' | 122°09' | buried by tephra set | 240 yrs. | 60 yrs. | charred wood fragments | C-14 | Crandell and others (1981) | |
| 172 | W-3138 | 46°14 | 122°09' | immediately below explosion rubble beneath tephra set W | 1410 yrs. | 70 yrs. | wood | C-14 | Crandell and others (1981) | |
| 173 | W-2441 | 46°14' | 122°05' | immediately below tephra set J | 11,880 yrs. | 110 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 174 | W-3262 | 46°14' | 122°05' | deposit of a hot lahar | 3280 yrs. | 90 yrs. | wood | C-14 | Crandell and others (1981) | |
| 175 | 89 | 46°13.30' | 121°59.88' | basalt of Paradise Falls | 0.04 | 0.03 | whole rock | K/Ar | Hammond and Korosec (1983) | |
| 176 | W-2924 | 46°13' | 121°56' | peat directly above tephra layer I | 1780 yrs. | 60 yrs. | peat | C-14 | Crandell and others (1981) | |
| 177 | 01 (89) | 46°13'18" | 121°59'53" | basalt of Paradise Falls | 0.04 | 0.03 | whole rock | K/Ar | Korosec (1987a) | Hammond and Korosec (1983) |
| 178 | 77-37B | 46°10'12" | 122°42'30" | Goble Volcanic Series | 45.0 | 1.4 | whole rock | K/Ar | Beck and Burr (1979) | Phillips (1987a) |
| 179 | 77-37B | 46°10'12" | 122°42'30" | Goble Volcanic Series | 41.4 | 1.3 | whole rock | K/Ar | Beck and Burr (1979) | Phillips (1987a) |
| 180 | BP0814851 (K-AR 8) | 46°10'17" | 122°25'00" | Goble Volcanics - basaltic andesite flow | 36.3 | 2.2 | whole rock | K/Ar | Phillips and others (1986) | Phillips (1987a) |
| 181 | W-3145 | 46°05' | 122°12' | sand interbedded with lahars | 12,270 yrs. | 90 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 182 | BP0814856 (K-AR 9) | 46°11'36" | 122°21'12" | andesite flow (lower Oligocene) | 32.9 | 2.6 | whole rock | K/Ar | Phillips and others (1986) | Phillips (1987a) |
| 183 | 92 (SH 414-1) | 46°09'48" | 122°18'36" | Goat Mountain plug (andesite) | 3.1 | 0.3 | hornblende | K/Ar | Engels and others (1976) | Phillips (1987a) |
| 184 | 92 (SH 414-1) | 46°09'48" | 122°18'36" | Goat Mountain plug (andesite) | 1.0 | 0.06 | biotite | K/Ar | Engels and others (1976) | Phillips (1987a) |
| 185 | 92 (SH 414-1) | 46°09'48" | 122°18'36" | Goat Mountain plug (andesite) | 0.7 | 0.06 | biotite | K/Ar | Engels and others (1976) | Phillips (1987a) |
| 186 | W-3995 | 46°08' | 122°19' | pumiceous pyroclastic-flow deposit | 290 yrs. | 70 yrs. | charcoal | C-14 | Crandell and others (1981) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 171 | Mt. St. Helens 7.5-min. | Skamania | NW | 26 | 9 N. | 5 E. | date is anomalously young |
| 172 | Mt. St. Helens 7.5-min. | Skamania | SE SE | 27 | 9 N. | 5 E. | corrected date by tree-ring calibration curve of Suess (1970) is about A.D. 600 (Crandell and others, 1981) |
| 173 | Smith Creek Butte 7.5-min. | Skamania | SE SE | 19 | 9 N. | 6 E. | sample provides an older limiting date for tephra set J |
| 174 | Smith Creek Butte 7.5-min. | Skamania | SE NE | 30 | 9 N. | 6 E. | corrected date by tree-ring calibration curve of Suess (1970) is about 1630 B.C. (Crandell and others, 1981) |
| 175 | Spencer Butte 7.5-min. | Skamania | SE NE | 36 | 9 N. | 6 E. | |
| 176 | Spencer Butte 7.5-min. | Skamania | SE | 33 | 9 N. | 7 E. | corrected date by tree-ring calibration curve of Suess (1970) is between about A.D. 150 and 250 (Crandell and others, 1981) |
| 177 | Spencer Butte 7.5-min. | Skamania | SW NE | 36 | 9 N. | 7 E. | |
| 178 | Hemlock Pass 7.5-min. | Cowlitz | SE | 17 | 8 N. | 1 E. | |
| 179 | Hemlock Pass 7.5-min. | Cowlitz | SE | 17 | 8 N. | 1 E. | |
| 180 | Elk Mountain 7.5-min. | Cowlitz | NE SE | 15 | 8 N. | 3 E. | quarry west of Big Bull Mountain |
| 181 | Mt. Mitchell 7.5-min. | Cowlitz | SW NW | 4 | 8 N. | 4 E. | |
| 182 | Goat Mountain 7.5-min. | Cowlitz | SE NE | 7 | 8 N. | 4 E. | due west of Mt. St. Helens |
| 183 | Goat Mountain 7.5-min. | Cowlitz | SE NE | 21 | 8 N. | 4 E. | (SW flank of Mt. St. Helens); Phillips (1987a) sample #K-AR31a; corrected date is 3.2 +/- 0.3 Ma after Dalrymple (1979) |
| 184 | Goat Mountain 7.5-min. | Cowlitz | SE NE | 21 | 8 N. | 4 E. | Phillips (1987a) sample #K-AR31b |
| 185 | Goat Mountain 7.5-min. | Cowlitz | SE NE | 21 | 8 N. | 4 E. | Phillips (1987a) sample #K-AR 31c |
| 186 | Goat Mountain 7.5-min. | Cowlitz | NW | 33 | 8 N. | 4 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 187 | W-2989 | 46°10' | 122°16' | lithic pyroclastic-flow deposit | 510 yrs. | 50 yrs. | charcoal (log) | C-14 | Crandell and others (1981) | |
| 188 | W-2980 | 46°12' | 122°15' | pumiceous pyroclastic-flow deposit | 2910 yrs. | 70 yrs. | charcoal (log) | C-14 | Crandell and others (1981) | |
| 189 | W-3993 | 46°08' | 122°13' | lahar of dacitic rock debris | modern | --- | log-wood | C-14 | Crandell and others (1981) | |
| 190 | W-2866 | 46°12' | 122°05' | from beneath the lowest of three lithic pyroclastic-flow deposits | 11,900 yrs. | 190 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 191 | W-2829 | 46°12' | 122°05' | immediately under tephra set P | 2930 yrs. | 60 yrs. | charred wood | C-14 | Crandell and others (1981) | |
| 192 | W-3260 | 46°10' | 122°05' | lahar - west bank of Smith Creek | <200 yrs. | --- | log-wood | C-14 | Crandell and others (1981) | |
| 193 | W-2991 | 46°09.5' | 122°04' | upper layer of tephra set J | 8900 yrs. | 70 yrs. | charred wood | C-14 | Crandell and others (1981) | |
| 194 | W-2527 | 46°08' | 122°09' | between tephra layers Bo and Bu | 1740 yrs. | 70 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 195 | 26 | 46°11'00" | 121°48'52" | Council Bluff andesite | 26.1 | 0.5 | whole rock | K/Ar | Korosec (1987a) | Laursen and Hammond (1979) |
| 196 | 26 | 46°11'00" | 121°48'52" | Council Bluff andesite | 26.5 | 0.7 | whole rock | K/Ar | Korosec (1987a) | Laursen and Hammond (1979) |
| 197 | MK88-8-14 | 46°08'13" | 121°46'48" | basalt of Tillicum Creek | 1.67 | 0.23 | groundmass plagioclase | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 198 | 03/16 | 46°08'37" | 121°46'21" | basalt of Tillicum Creek | 0.47 | 0.04 | whole rock | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 199 | 08 (01) | 46°10'32" | 121°38'14" | andesite of Swampy Meadow | 0.37 | 0.01 | whole rock | K/Ar | Korosec (1987a) | Hammond and Korosec (1983) |
| 200 | 05 | 46°09'30" | 121°25'12" | Hellroaring Creek Falls olivine andesite | 0.27 | 0.04 | whole rock | K/Ar | Korosec (1987a) | Armstrong and others (1976) |
| 201 | --- | 46°09'30" | 121°25'12" | Hellroaring Creek Falls olivine andesite | 0.21 | 0.05 | whole rock | K/Ar | Korosec (1987a) | Armstrong and others (1976) |
| 202 | K-AR 3 | 46°04'36" | 122°48'42" | Goble Volcanics - basaltic andesite flow | 42.8 | 1.2 | plagioclase | K/Ar | Phillips (1987a) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 187 | Goat Mountain 7.5-min. | Cowlitz | NW NE | 26 | 8 N. | 4 E. | |
| 188 | Goat Mountain 7.5-min. | Cowlitz | SW SE | 12 | 8 N. | 4 E. | corrected date by tree-ring calibration curve of Suess (1970) is either about 1130 or 1210 B.C. (Crandell and others, 1981) |
| 189 | Smith Creek Butte 7.5-min. | Skamania | SE NW | 32 | 8 N. | 5 E. | |
| 190 | Smith Creek Butte 7.5-min. | Skamania | NW NE | 5 | 8 N. | 6 E. | |
| 191 | Smith Creek Butte 7.5-min. | Skamania | NW NW | 9 | 8 N. | 6 E. | corrected date by tree-ring calibration curve of Suess (1970) is about 1220 B.C. (Crandell and others, 1981) |
| 192 | Smith Creek Butte 7.5-min. | Skamania | NW NW | 15 | 8 N. | 6 E. | date is anomalously young |
| 193 | Smith Creek Butte 7.5-min. | Skamania | SE | 21 | 8 N. | 6 E. | |
| 194 | Mt. St. Helens 7.5-min. | Skamania | NE | 26 | 8 N. | 6 E. | corrected date by tree-ring calibration curve of Suess (1970) is about A.D. 270 (Crandell and others, 1981) |
| 195 | Quartz Creek Butte 7.5-min. | Skamania | SW NE | 16 | 8 N. | 8 E. | |
| 196 | Quartz Creek Butte 7.5-min. | Skamania | SW N‰ | 16 | 8 N. | 8 E. | |
| 197 | Quartz Creek Butte 7.5-min. | Skamania | NW NW | 35 | 8 N. | 8 E. | Hammond and Korosec (1983) - whole rock K/Ar = 0.47 +/- 0.04 Ma; Indian Heaven volcanic field (SW of Mt. Adams) |
| 198 | Quartz Creek Butte 7.5-min. | Skamania | NE NW | 35 | 8 N. | 8 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 199 | Steamboat Mtn. 7.5-min. | Skamania | SE SE | 14 | 8 N. | 9 E. | |
| 200 | Mt. Adams East 7.5-min. | Yakima | NW NW | 27 | 8 N. | 11 E. | SE flank of Mt. Adams |
| 201 | Mt. Adams East 7.5-min. | Yakima | NW NW | 27 | 8 N. | 11 E. | |
| 202 | Kalama 7.5-min. | Cowlitz | NE SE | 19 | 7 N. | 1 W. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 203 | K-AR 4 | 46°02'10" | 122°51'18" | Goble Volcanics - basaltic andesite flow | 37.4 | 0.7 | whole rock | K/Ar | Phillips (1987a) | Beck and Burr (1979) |
| 204 | K-AR 33 | 46°00'45" | 122°53'00" | Goble Volcanics - basaltic andesite | 30.0 | --- | whole rock | K/Ar | Phillips (1987a) | |
| 205 | W-2436 | 46°06' | 122°36' | lenticular bed of fluvially transported pumice gravel | 2200 yrs. | 50 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 206 | W-2653 | 46°04' | 122°14' | lahar | 36,000 yrs. | 2100 yrs. | wood (log) | C-14 | Crandell and others (1981) | |
| 207 | W-2413 | 46°03' | 122°12' | pumiceous pyroclastic-flow deposit | 18,560 yrs. | 180 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 208 | W-2277 | 46°06' | 122°13' | tree roots beneath the Cave Basalt lava flow within the Lake Cave lava tube | 1860 yrs. | 70 yrs. | charcoal (tree roots) | C-14 | Crandell and others (1981) | |
| 209 | W03141 | 46°05' | 122°12' | pumiceous pyroclastic-flow deposit | 12,910 yrs. | 160 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 210 | 72 (K-AR 22) | 46°04.35' | 122°08.85' | andesite flows of Marble Mountain | 0.162 | 0.006 | whole rock | K/Ar | Hammond and Korosec (1983) | Phillips (1987a) |
| 211 | W-3266 | 46°06' | 122°04' | lithic pyroclastic-flow deposit | 2450 yrs. | 90 yrs. | charcoal | C-14 | Crandell and others (1981) | |
| 212 | W-2655 | 46°05' | 122°00'15" | lahar | 11,800 yrs. | 90 yrs. | wood (log) | C-14 | Crandell and others (1981) | |
| 213 | MK85-8-16 | 46°02'30" | 122°02'03" | andesite of Swift Reservoir | 28.5 | 1.8 | whole rock | K/Ar | Korosec (1987b) | Phillips and others (1986) |
| 214 | 12 | 46°03'08" | 121°50'41" | basalt of Lone Butte (pillow) | 0.091 | 0.01 | whole rock | K/Ar | Korosec (1989) | |
| 215 | MK88-9-75 | 46°03'08" | 121°50'41" | basaltic andesite of Lone Butte | 0.314 | 0.054 | groundmass plagioclase | K/Ar | Korosec (1989) | |
| 216 | 11 | 46°03'08" | 121°50'34" | basalt of Lone Butte (dike) | 0.252 | 0.007 | whole rock | K/Ar | Korosec (1989) | |
| 217 | 14 | 45°57'00" | 121°45'55" | basalt of Goose Lake | 0.795 | 0.028 | whole rock | K/Ar | Korosec (1989) | |
| 218 | 08/12 | 46°05'07" | 121°54'46" | basalt of Thomas Lake | 3.7 | 0.5 | whole rock | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |

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| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 203 | Kalama 7.5-min. | Cowlitz | NE NE | 6 | 6 N. | 1 W. | |
| 204 | Rainier 7.5-min. | Columbia | SW SW | 12 | 6 N. | 2 W. | |
| 205 | Georges Peak 7.5-min. | Cowlitz | --- | 31 | 7 N. | 2 E. | corrected date by tree-ring calibration curve of Suess (1970) is either about 190, 250, or 370 B.C. (Crandell and others, 1981) |
| 206 | Mt. Mitchell 7.5-min. | Skamania | SE | 30 | 7 N. | 5 E. | |
| 207 | Mt. Mitchell 7.5-min. | Skamania | SE | 29 | 7 N. | 5 E. | overlies tephra set M |
| 208 | Mt. Mitchell 7.5-min. | Skamania | --- | 17 | 7 N. | 5 E. | corrected date by tree-ring calibration curve of Suess (1970) is about A.D. 100 (Crandell and others, 1981) |
| 209 | Mt. Mitchell 7.5-min. | Skamania | SW | 16 | 7 N. | 5 E. | sample provides an older limit for the age of this part of tephra set S |
| 210 | Mt. Mitchell 7.5-min. | Skamania | SE SE | 23 | 7 N. | 5 E. | north shore of Swift Reservoir |
| 211 | Cedar Flats 7.5-min. | Skamania | NE SE | 9 | 7 N. | 6 E. | corrected date by tree-ring calibration curve of Suess (1970) is either about 530, 640, or 780 B.C. (Crandell and others, 1981) |
| 212 | Cedar Flats 7.5-min. | Skamania | center | 13 | 7 N. | 6 E. | underlies tephra of set J |
| 213 | Cedar Flats 7.5-min. | Skamania | SW SW | 35 | 7 N. | 6 E. | |
| 214 | Burnt Peak 7.5-min. | Skamania | SE NW | 31 | 7 N. | 7 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 215 | Burnt Peak 7.5-min. | Skamania | SE NW | 31 | 7 N. | 7 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 216 | Burnt Peak 7.5-min. | Skamania | SW NW | 32 | 7 N. | 7 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 217 | Burnt Peak 7.5-min. | Skamania | NW SE | 32 | 7 N. | 7 E. | T and R do not occur at latitude given by Korosec; Indian Heaven volcanic field (SW of Mt. Adams) |
| 218 | Burnt Peak 7.5-min. | Skamania | SE SE | 15 | 7 N. | 7 E. | Indian Heaven volcanic field (SW of Mt. Adams) |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 219 | MK88-8-8 | 46°05'02" | 121°54'51" | basalt of Thomas Lake | 0.217 | 0.122 | groundmass plagioclase | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 220 | 13 | 46°03'25" | 121°54'09" | basalt of Burnt Peak | 0.16 | 0.038 | whole rock | K/Ar | Korosec (1989) | |
| 221 | MK88-8-9 | 46°03'25" | 121°54'09" | basalt of Burnt Peak | 0.309 | 0.075 | groundmass plagioclase | K/Ar | Korosec (1989) | |
| 222 | 10 | 46°02'55" | 121°42'35" | basalt of Little Goose Creek | 0.28 | 0.4 | whole rock | K/Ar | Korosec (1989) | |
| 223 | 04/14 | 46°06'08" | 121°47'50" | basalt of Sawtooth Mountain | 0.85 | 0.05 | whole rock | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 224 | MK88-8-24 | 46°05'59" | 121°47'45" | basalt of Sawtooth Mountain | 0.394 | 0.039 | groundmass plagioclase | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 225 | 09 | 46°05'40" | 121°43'30" | basaltic andesite of Meadow Creek | 1.21 | 0.05 | whole rock | K/Ar | Korosec (1989) | |
| 226 | MK88-8-11 | 46°05'39" | 121°43'33" | andesite of Meadow Creek | 0.277 | 0.02 | groundmass plagioclase | K/Ar | Korosec (1989) | Hammond (1985) |
| 227 | 05/30 | 46°05'27" | 121°41'48" | basalt of Trout Lake Creek | 0.98 | 0.12 | whole rock | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 228 | MK88-8-10 | 46°05'06" | 121°40'36" | basalt of Trout Lake Creek | 0.492 | 0.084 | groundmass plagioclase | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 229 | MK98415 | 46°02'30" | 121°44'40" | basaltic andesite at Bishop Mountain | 30.1 | 2.2 | whole rock | K/Ar | Phillips and others (1986) | Korosec (1987a) |
| 230 | 16 | 46°08.61' | 121°46.35' | basalt of Tillicum Creek | 0.47 | 0.04 | whole rock | K/Ar | Hammond and Korosec (1983) | |
| 231 | 07/28b | 46°04'05" | 121°38'59" | basalt west of Skull Creek | 1.34 | 0.02 | whole rock | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 232 | 14 (28a) | 46°04'05" | 121°38'59" | basalt west of Skull Creek | 0.93 | 0.82 | whole rock | K/Ar | Korosec (1987a) | Hammond and Korosec (1983) |
| 233 | 02 (KM-2) | 46°04'42" | 121°26'36" | King Mountain flow | 0.1 | 0.1 | whole rock | K/Ar | Korosec (1987a) | Shannon and Wilson (1973) |
| 234 | 06 (KM-1) | 46°04'12" | 121°25'54" | King Mountain flow | 0.3 | 0.20 | whole rock | K/Ar | Korosec (1987a) | Shannon and Wilson (1973) |

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| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 219 | Burnt Peak 7.5-min. | Skamania | SW SW | 14 | 7 N. | 7 E. | Hammond and Korosec (1983) performed whole rock K/Ar analysis which yielded an age of 3.7 +/- 0.5 Ma. Korosec (1989) analyzed separates of groundmass plagioclase from the same sample. |
| 220 | Burnt Peak 7.5-min. | Skamania | SE SE | 26 | 7 N. | 7 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 221 | Burnt Peak 7.5-min. | Skamania | SE SE | 26 | 7 N. | 7 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 222 | Lone Butte 7.5-min. | Skamania | NE SE | 30 | 7 N. | 8 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 223 | Lone Butte 7.5-min. | Skamania | SE SE | 9 | 7 N. | 8 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 224 | Lone Butte 7.5-min. | Skamania | NW NW | 15 | 7 N. | 8 E. | Hammond and Korosec (1983) performed whole rock K/Ar analysis which yielded an age of 0.85 +/- 0.05 Ma. Korosec (1989) analyzed separates of groundmass plagioclase from the same sample. |
| 225 | Sleeping Beauty 7.5-min. | Skamania | SW NW | 18 | 7 N. | 9 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 226 | Lone Butte 7.5-min. | Skamania | SE NW | 18 | 7 N. | 9 E. | Hammond (1985) performed whole rock K/Ar analysis on this same sample which yielded an age of 1.21 +/- 0.05 Ma; Indian Heaven volcanic field (SW of Mt. Adams) |
| 227 | Sleeping Beauty 7.5-min. | Skamania | NE NE | 20 | 7 N. | 9 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 228 | Sleeping Beauty 7.5-min. | Skamania | NW NW | 29 | 7 N. | 9 E. | Hammond and Korosec (1983) performed whole rock K/Ar analysis on this same sample which yielded an age of 0.98 +/- 0.12 Ma. |
| 229 | Sleeping Beauty 7.5-min. | Lewis | SE SE | 36 | 7 N. | 8 E. | |
| 230 | Sleeping Beauty 7.5-min. | Skamania | NW | 35 | 7 N. | 9 E. | |
| 231 | Trout Lake 7.5-min. | Skamania | SE NW | 25 | 7 N. | 9 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 232 | Trout Lake 7.5-min. | Skamania | SE NW | 25 | 7 N. | 9 E. | |
| 233 | Glenwood 7.5-min. | Yakima | NE SW | 21 | 7 N. | 11 E. | |
| 234 | King Mountain 7.5-min. | Yakima | SW NW | 27 | 7 N. | 11 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 235 | --- | 46°04'12" | 121°25'54" | King Mountain flow | 0.3 | 0.08 | whole rock | K/Ar | Korosec (1987a) | Shannon and Wilson k(1973) |
| 236 | MK8586 (K-AR 12) | 46°02'30" | 122°02'03" | andesite flow (upper Oligocene and lower Miocene) | 28.5 | 1.8 | whole rock | K/Ar | Phillips and others (1986) | Phillips (1987a) |
| 237 | MK85-5-46 | 46°00'10" | 121°53'20" | andesite west of McClellan Meadow (volcanic rocks of Council Bluff) | 19.43 | 0.4 | whole rock | K/Ar | Korosec (1987b) | Phillips and others (1986) |
| 238 | 17 | 45°58'00" | 121°44'45" | basalt of Lake Comcomly | 29,000 yrs. | 100 yrs. | twigs | C-14 | Korosec (1989) | |
| 239 | 18 | 45°58'00" | 121°44'45" | basalt of Lake Comcomly | 30,300 yrs. | 1,000 yrs. | branch | C-14 | Korosec (1989) | |
| 240 | 03 (32) | 46°01'01" | 121°31'32" | basalt of Gotchen Creek | 0.20 | 0.034 | whole rock | K/Ar | Korosec (1987a) | Hammond and Korosec (1983) |
| 241 | (32) | 46°01'01" | 121°31'32" | basalt of Gotchen Creek | 0.24 | 0.71 | whole rock | K/Ar | Korosec (1987a) | Hammond and Korosec (1983) |
| 242 | YU-E1 | 45°56' | 123°59' | Grande Ronde Basalt, Columbia River Basalt Group; sill (Tillamook Head sill) | 15.9 | 0.3 | whole rock | K/Ar | Niem and Cressy (1973) | Laursen and Hammond (1978); Fiebelkorn and others (1982) |
| 243 | KA 2134 | 46°55.0' | 123°58' | Grande Ronde Basalt (intrusion), Columbia River Basalt Group | 14 | 2.7 | whole rock | K/Ar | Turner (1970) | Fiebelkorn and others (1982); Snavely and others (1973); Walker and others (1974); Laursen and Hammond (1974) |
| 244 | M82-8-G2 | 45°54'10" | 123°30'40" | Tillamook Volcanic Series - upper | 42.4 | 0.4 | whole rock | K/Ar | Mumford (1988) | |
| 245 | | 45°52'15" | 123°29'15" | Tillamook Volcanic Series - upper | 40.1 | 1.2 | whole rock | K/Ar | Mumford (1988) | |
| 246 | --- | 45°52'45" | 123°24'35" | Tillamook Volcanic Series - upper | 37.1 | 0.4 | whole rock | K/Ar | Nelson (1985) | Mumford (1988) |
| 247 | Green Mtn. quarry | 45°52'45" | 123°23'45" | Tillamook Volcanic Series | 36.8 | 0.4 | whole rock | K/Ar | Safiey (1989) | |
| 248 | Green Mtn. quarry | 45°52'45" | 123°23'45" | Tillamook Volcanic Series | 37.1 | 0.4 | whole rock | K/Ar | Safiey (1989) | |
| 249 | Green Mtn. quarry | 45°52'45" | 123°23'45" | Tillamook Volcanic Series | 40.1 | 1.2 | whole rock | K/Ar | Safiey (1989) | |
| 250 | BP0816851 | 45°56'00" | 122°14'41" | basalt sill (Oligocene) | 26.6 | 2.3 | whole rock | K/Ar | Phillips and others (1986) | Phillips (1987b) |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 235 | King Mountain 7.5-min. | Yakima | SW N. | 27 | 7 N. | 11 E. | |
| 236 | Cedar Flats 7.5-min. | Skamania | center | 13 | 6 N. | 6 E. | SE shore of Swift Reservoir according to Phillips and others (1986); lat. & long. do not plot close to the reservoir. T and R location were deciphered from the lat. & long. provided by Phillips and others (1986). |
| 237 | Burnt Peak 7.5-min. | Skamania | NW NW | 23 | 6 N. | 7 E. | |
| 238 | Little Huckleberry Mtn. 7.5-min. | Skamania | SW NE | 21 | 6 N. | 8 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 239 | Little Huckleberry Mtn. 7.5-min. | Skamania | SW NE | 21 | 6 N. | 8 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 240 | Trout Lake 7.5-min. | Klickitat | SW SW | 11 | 6 N. | 10 E. | |
| 241 | King Mountain 7.5-min. | Klickitat | SW SW | 11 | 6 N. | 10 E. | |
| 242 | Tillamook Head 7.5-min. | Clatsop | NW | 7 | 5 N. | 10 W. | north end of Indian Beach in Ecola State Park; corrected date is 16.3 +/- 0.3 Ma after Dalrymple (1979) |
| 243 | Tillamook Head 7.5-min. | Clatsop | SE NE | 18 | 5 N. | 10 W. | Ecola State Park; 620 ft elevation; corrected date is 14.4 +/- 2.7 Ma after Dalrymple (1979) |
| 244 | Vinemaple 7.5-min. | Clatsop | center | 23 | 5 N. | 7 W. | sample was acid-treated prior to analysis |
| 245 | Sunset Spring 7.5-min. | Clatsop | --- | 36? | 5 N. | 7 W. | sample was acid-treated before analysis by LedaBeth Pickthorn (USGS) |
| 246 | Sager Creek 7.5-min. | Clatsop | center | 34 | 5 N. | 6 W. | |
| 247 | Sager Creek 7.5-min. | Clatsop | NW | 35 | 5 N. | 6 W. | |
| 248 | Sager Creek 7.5-min. | Clatsop | NW | 35 | 5 N. | 6 W. | |
| 249 | Sager Creek 7.5-min. | Clatsop | NW | 35 | 5 N. | 6 W. | sample was acid-treated prior to analysis by Leda Beth Pickthorn (USGS) |
| 250 | Siouxon Peak 7.5-min. | Skamania | SW NW | 7 | 5 N. | 5 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 251 | 39 | 45°54.72 | 122°05.61' | basalt of Puny Creek | 0.0077 | 0.00028 | --- | C-14 | Hammond and Korosec (1983) | |
| 252 | 37 (K-AR 8) | 45°59.06' | 122°03.48' | basalt flow of Soda Peaks | 0.36 | 0.01 | whole rock | K/Ar | Hammond and Korosec (1983) | Phillips (1987b) |
| 253 | MK88-8-18 | 45°53'36" | 121°50'38" | andesite of Black Creek | 0.203 | 0.036 | groundmass plagioclase | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 254 | 01/128 | 45°56'46" | 121°53'17" | basaltic andesite of Juice Creek | 1.4 | 0.06 | whole rock | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 255 | MK88-8-20 | 45°56'23" | 121°54'13" | andesite of Juice Creek | 0.292 | 0.033 | groundmass plagioclase | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 256 | 128 | 45°56'46" | 121°53'17" | basaltic andesite of Juice Creek | 1.40 | 0.06 | whole rock | K/Ar | Korosec (1987b) | Hammond and Korosec (1983) |
| 257 | 02/017 | 45°53'37" | 121°50'02" | andesite of Black Creek | 3.3 | 0.25 | whole rock | K/Ar | Korosec (1989) | Hammond and Korosec (1983) |
| 258 | MK87-9-70 | 45°56'32" | 121°45'32" | andesite of Forlorn Lake | 0.125 | 0.014 | groundmass plagioclase | K/Ar | Korosec (1989) | |
| 259 | 15 | 45°56'06" | 121°41'00" | basalt of Big Lava Bed | 8,100 yrs. | 110 yrs. | twigs | C-14 | Korosec (1989) | Hammond and Korosec (1983) |
| 260 | 16 | 45°54'42" | 121°41'55" | basalt of Big Lava Bed | 8,200 yrs. | 100 yrs. | twigs | C-14 | Korosec (1989) | Hammond and Korosec (1983) |
| 261 | YU-1N | 45°45' | 123°58' | Grande Ronde Basalt, Columbia River Basalt Group, sill | 15.5 | 0.4 | whole rock | K/Ar | Niem and Cressy (1973) | Laursen and Hammond (1978); Fiebelkorn and others (1982) |
| 262 | SR 59-17 | 45°44'40" | 123°57'25" | Grande Ronde Basalt , Columbia River Basalt Group; sill | 16.0 | 0.65 | whole rock? | K/Ar | Tatsumoto and Snavely (1969) | Laursen and Hammond (1974) |
| 263 | M82-8-T4 | 45°46'35" | 123°38'15" | Tillamook Volcanic Series - upper | 42.5 | 0.4 | whole rock | K/Ar | Mumford (1988) | |
| 264 | --- | 45°50'00" | 123°29'00" | Tillamook Volcanic Series - upper | 40.2 | 0.4 | whole rock | K/Ar | Mumford (1988) | |
| 265 | --- | 45°51'20" | 123°25'10" | Tillamook Volcanic Series - upper | 37.1 | 0.4 | whole rock | K/Ar | Mumford (1988) | |
| 266 | Ginger Creek | 45°51'15" | 123°23'15" | Tillamook Volcanic Series | 39.1 | 0.4 | whole rock | K/Ar | Safley (1989) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 251 | Bare Mountain 7.5-min. | Skamania | NE SW | 17 | 5 N. | 6 E. | |
| 252 | Bare Mountain 7.5-min. | Skamania | SW SE | 21 | 5 N. | 6 E. | |
| 253 | Gifford Peak 7.5-min. | Skamania | NE SE | 30 | 5 N. | 8 E. | Hammond and Korosec (1983) performed whole rock K/Ar analysis on the same sample which yielded an age of 3.3 +/- 0.25 Ma. |
| 254 | Termination Point 7.5-min. | Skamania | SE SE | 28 | 5 N. | 7 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 255 | Termination Point 7.5-min. | Skamania | NW NW | 11 | 5 N. | 7 E. | Hammond and Korosec (1983) performed whole rock K/Ar analysis on the same sample which yielded an age of 1.4 +/- 0.06 Ma. |
| 256 | Termination Point 7.5-min. | Skamania | NE SW | 12 | 5 N. | 7 E. | |
| 257 | Gifford Peak 7.5-min. | Skamania | NE SE | 30 | 5 N. | 8 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 258 | Gifford Peak 7.5-min. | Skamania | NE SE | 2 | 5 N. | 8 E. | first reported in this pub.; Indian Heaven volcanic field (SW of Mt. Adams) |
| 259 | Little Huckleberry Mtn. 7.5-min. | Skamania | NW SE | 8 | 5 N. | 9 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 260 | Little Huckleberry Mtn. 7.5-min. | Skamania | NE NE | 20 | 5 N. | 9 E. | Indian Heaven volcanic field (SW of Mt. Adams) |
| 261 | Nehalem 7.5-min. | Tillamook | W 1/2 | 18 | 3 N. | 10 W. | Neahkahnie Mountain; corrected date is 15.9 +/- 0.4 Ma after Dalrymple (1979) |
| 262 | Nehalem 7.5-min. | Tillamook | SE | 18 | 3 N. | 10 W. | Neahkahnie Mountain; corrected date is 16.4 +/- 0.65 Ma after Dalrymple (1979) |
| 263 | Hamlet 7.5-min. | Clatsop | SW | 35 | 4 N. | 8 W. | sample was acid-treated prior to analysis |
| 264 | Sunset Spring 7.5-min. | Clatsop | --- | 18? | 4 N. | 6 W. | |
| 265 | Sunset Spring 7.5-min. | Clatsop | SW | 3 | 4 N. | 6 W. | |
| 266 | Sunset Spring 7.5-min. | Clatsop | SE | 2 | 4 N. | 6 W. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 267 | Rock Creek Rd. | 45°49'30" | 123°25'20" | Tillamook Volcanic Series | 40.2 | 0.4 | whole rock | K/Ar | Safley (1989) | |
| 268 | McGregor Rd. | 45°48'20" | 123°23'25" | Tillamook Volcanic Series | 37.3 | 0.5 | whole rock | K/Ar | Safley (1989) | |
| 269 | Wheeler Rd. | 45°46'30" | 123°25'50" | Tillamook Volcanic Series | 36.4 | 0.4 | whole rock | K/Ar | Safley (1989) | |
| 270 | MM0904851 | 45°47'39" | 121°59'53" | Sedum Point basalt | 23.6 | 1.2 | whole rock | K/Ar | Korosec (1987b) | Phillips and others (1986) |
| 271 | 002 | 45°47'44" | 121°56'08" | Ohanapecosh Fm. - dacite flow | 22.7 | 0.3 | whole rock | K/Ar | Korosec (1987b) | Berri and Korosec (1983) |
| 272 | 004 | 45°50'14" | 121°53'36" | diorite at Warren Ridge | 23.2 | 1.0 | whole rock | K/Ar | Korosec (1987b) | Berri and Korosec (1983) |
| 273 | MK85-9-7 | 45°51'45" | 121°55'25" | Big Butte basalt | 20.8 | 1.2 | whole rock | K/Ar | Korosec (1987b) | Phillips and others (1986) |
| 274 | MK85-5-5 | 45°47'35" | 121°43'55" | Lost Creek basalt | 12.9 | 0.3 | whole rock | K/Ar | Korosec (1987b) | Phillips and others (1986) |
| 275 | 42 | 45°48.24' | 121°41.52' | basalt of Big Lava Bed | 0.0082 | 0.0001 | --- | C-14 | Hammond and Korosec (1983) | |
| 276 | MK85-5-23 | 45°47'00" | 121°40'25" | Hauk Butte diorite | 4.8 | 0.1 | whole rock | K/Ar | Korosec (1987b) | Phillips and others (1986) |
| 277 | 051 | 45°51'16" | 121°30'05" | basalt of Gilmer Creek | 1.76 | 0.50 | whole rock | K/Ar | Korosec (1987b) | Hammond and Korosec (1983) |
| 278 | KK0904855 | 45°46'58" | 122°17'25" | andesite flow (Oligocene) | 28.1 | 2.7 | whole rock | K/Ar | Phillips and others (1986) | Phillips (1987b) |
| 279 | WA-058A | 46°46.33' | 122°12' | alteration of granodiorite intrusion (Silver Star pluton) | 19.0 | 0.7 | whole rock | K/Ar | Power and others (1981) | Phillips (1987b) |
| 280 | WA-11 | 46°46.72' | 122°12.48' | granodiorite intrusion (Silver Star pluton) | 19.6 | 0.7 | whole rock | K/Ar | Power and others (1981) | Phillips (1987b) |
| 281 | K-AR 7 | 45°45'20" | 122°03'15" | tuff - lower Miocene to upper Oligocene | 32.8 | 0.8 | whole rock | K/Ar | Phillips (1987b) | Hammond (1980) |
| 282 | 155 | 45°45'14" | 121°49'58" | basalt of Trout Creek Hill | 0.34 | 0.07 | whole rock | K/Ar | Korosec (1987b) | Hammond and Korosec (1983) |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 267 | Sunset Spring 7.5-min. | Clatsop | SE | 16 | 4 N. | 6 W. | |
| 268 | Sunset Spring 7.5-min. | Clatsop | N 1/2 | 26 | 4 N. | 6 W. | |
| 269 | Sunset Spring 7.5-min. | Clatsop | NE | 4 | 3 N. | 6 W. | |
| 270 | Stabler 7.5-min. | Skamania | NW NW | 31 | 4 N. | 7 E. | |
| 271 | Stabler 7.5-min. | Skamania | SW SW | 27 | 4 N. | 7 E. | suspect data, possibly reset by diorite pluton at Warren Ridge |
| 272 | Stabler 7.5-min. | Skamania | NW | 23 | 4 N. | 7 E. | |
| 273 | Stabler 7.5-min. | Skamania | NE NE | 3 | 4 N. | 7 E. | |
| 274 | Willard 7.5-min. | Skamania | NW SE | 25 | 4 N. | 8 E. | |
| 275 | Willard 7.5-min. | Skamania | SE | 29 | 4 N. | 9 E. | |
| 276 | Willard 7.5-min. | Skamania | SE SE | 33 | 4 N. | 9 E. | |
| 277 | Northwestern Lake 7.5-min. | Klickitat | NW | 12 | 4 N. | 10 E. | |
| 278 | Dole 7.5-min. | Clark | NW SE | 3 | 3 N. | 4 E. | |
| 279 | Gumboot Mtn. 7.5-min. | Skamania | NW NW | 4 | 3 N. | 5 E. | |
| 280 | Gumboot Mtn. 7.5-min. | Skamania | NW SW | 4 | 3 N. | 5 E. | |
| 281 | Lookout Mtn. 7.5-min. | Skamania | SW SE | 10 | 3 N. | 6 E. | |
| 282 | Big Huckleberry Mtn. 7.5-min. | Skamania | SE SE | 7 | 3 N. | 8 E. | |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited In: |
|---|---|---|---|---|---|---|---|---|---|---|
| 283 | 061 | 45°43'43" | 121°36'20" | basalt of Underwood Mountain | 0.85 | 0.02 | whole rock | K/Ar | Korosec (1987b) | Hammond and Korosec (1983) |
| 284 | 013 | 45°44'32" | 121°50'21" | Stevenson Ridge Fm. - basaltic andesite | 15.7 | 1.5 | whole rock | K/Ar | Korosec (1987b) | Berri and Korosec (1983) |
| 285 | 017 | 45°43'00" | 121°47'50" | basalt of Trout Creek Hill | 0.338 | 0.075 | whole rock | K/Ar | Korosec (1987b) | Berri and Korosec (1983) |
| 286 | MK85-5-1 | 45°43'07" | 121°45'35" | Wind Mountain quartz diorite | 4.9 | 0.08 | whole rock | K/Ar | Korosec (1987b) | Phillips and others (1986) |
| 287 | W-746 | 45°43' | 121°46' | foreset-bedded gravel delta | >34,000 yrs. | --- | wood | C-14 | Rubin and Alexander (1960) | |
| 288 | R07276 | 45°41'38" | 121°44'38" | Shell Rock diorite | 5.7 | 0.6 | whole rock | K/Ar | Korosec (1987b) | |
| 289 | 61 | 45°43.72' | 121°36.34' | basalt of Underwood Mountain | 0.85 | 0.02 | whole rock | K/Ar | Hammond and Korosec (1983) | |
| 290 | R-7277 | 45°42'15" | 121°44'40" | Wind Mountain quartz diorite | 6.6 | 0.7 | whole rock | K/Ar | Korosec (1987b) | |
| 291 | W-529 | 45°44' | 121°31' | mudflow that overlies Columbia River gravels | >35,000 yrs. | --- | wood | C-14 | Rubin and Alexander (1960) | |
| 292 | 93 (KA 1245) | 45°40' | 121°37'15" | Ellensburg Fm. (andesitic tuff) | 10.0 | --- | plagioclase | K/Ar | Engels and others (1976) | Evernden and James (1964) p. 965, 969 |
| 293 | W83-16R | 45°35'6" | 123°17'15" | Tillamook Volcanic Series (basalt) | 39.4 | 1.5 | whole rock | K/Ar | R. E. Wells (USGS, written commun., 1991) | |
| 294 | MM0903851 | 45°37'31" | 122°19'35" | basalt flow (Oligocene) | 27.9 | 1.9 | whole rock | K/Ar | Phillips and others (1986) | Phillips (1987b) |
| 295 | K-AR 4 | 45°37'45" | 122°13'30" | basalt of Bear Prairie | 1.53 | 0.2 | whole rock | K/Ar | Phillips (1987b) | Hammond and Korosec (1983) |
| 296 | 1 (7757) | 45°35.1' | 122°06.5' | Grande Ronde Basalt, Columbia River Basalt Group | 15.7 | 0.4 | whole rock | K/Ar | Fiebelkorn and others (1982) | Lux (1982) |
| 297 | 2 (7755) | 45°35.1' | 122°06.5' | Wanapum Basalt, Columbia River Basalt Group | 15.2 | 0.2 | whole rock | K/Ar | Fiebelkorn and others (1982) | Lux (1982) |
| 298 | --- | 45°27'00" | 122°39'15" | Basalt of Wavery Heights | 40 | --- | whole rock | K/Ar | Beeson and others (1989) | |

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| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 283 | Hood River 7.5-min. | Skamania | NE SW | 9 | 3 N. | 8 E. | T and R location is north of 45°45' |
| 284 | Carson 7.5-min. | Skamania | SE SE | 18 | 3 N. | 8 E. | |
| 285 | Carson 7.5-min. | Skamania | SE SE | 28 | 3 N. | 8 E. | Table 1 |
| 286 | Carson 7.5-min. | Skamania | NW SE | 26 | 3 N. | 8 E. | |
| 287 | Carson 7.5-min. | Skamania | SW SE | 26 | 3 N. | 8 E. | |
| 288 | Mt. Defiance 7.5-min. | Hood River | --- | 6 | 2 N. | 9 E. | |
| 289 | Hood River 7.5-min. | Skamania | center W 1/2 | 19 | 3 N. | 10 E. | |
| 290 | Mt. Defiance 7.5-min. | Hood River | --- | 35 | 3 N. | 9 E. | |
| 291 | Hood River 7.5-min. | Klickitat | SE NE | 23 | 3 N. | 10 E. | |
| 292 | Mt. Defiance 7.5-min. | Hood River | SW | 7 | 2 N. | 12 E. | corrected date is 10.3 Ma after Dalrymple (1979) |
| 293 | Roaring Creek 7.5-min. | Washington | center | 10 | 1 N. | 5 W. | |
| 294 | Camas 7.5-min. | Clark | NE SW | 28 | 2 N. | 4 E. | |
| 295 | Bobs Mountain 7.5-min. | Skamania | SW NW | 29 | 2 N. | 5 E. | |
| 296 | Multnomah Falls 7.5-min. | Multnomah | NW | 8 | 1 N. | 6 E. | Multnomah Falls State Park |
| 297 | Multnomah Falls 7.5-min. | Multnomah | NW | 8 | 1 N. | 6 E. | Multnomah Falls State Park |
| 298 | Lake Oswego 7.5-min. | Clackamas | --- | 51? | 1 S. | 1 E. | Banks of Willamette River at Waverly Country Club; locality is about 1 mile south of the south boundary of the map. The date is included because this basalt has previously been mapped as Columbia River Basalt. |

| Map No. | Sample No. | North Latitude | West Longitude | Geologic Unit | Date (Ma) | S.D. (+/-) | Material Dated | Method | Source | Also Cited in: |
|---|---|---|---|---|---|---|---|---|---|---|
| 299 | --- | 46°44'45" (approx.) | 123°33' (approx.) | Pomona Basalt, Columbia River Basalt Group | 9.0 | 1.4 | whole rock? | K/Ar | Snavely and others (1973) | |
| 300 | #4334 | 46°53'45" | 123°17' | Crescent Formation | 38.9 | 1.2 | whole rock | K/Ar | Armentrout and others (1980) | Prothero and Armentrout (1985) |
| 301 | #4337 | 47°03'19" | 123°12'15" | Crescent Formation | 47.5 | 1.7 | whole rock | K/Ar | Armentrout and others (1980) | |

- Continued -

| Map No. | Quad. | County | qtr of qtr | sec. | T. | R. | Comments |
|---|---|---|---|---|---|---|---|
| 299 | East of Raymond 7.5-min. | Pacific | --- | 33? | 15 N. | 7 W. | Basalt of Pack Sack Lookout of Snavely and others (1973). This basalt is chemically and stratigraphically equivalent to the Pomona Basalt. Date may be too young. |
| 300 | Malone 7.5-min. | Grays Harbor | SW | 2 | 16 N. | 5 W. | Prothero and Armentrout (1985) recalculated the age to 38.5 +/_ 1.6 Ma, using the decay constants of Steiger and Jäger (1977). Porter Bluffs area |
| 301 | Kamilche Valley 7.5-min. | Thurston | SE | 8 | 18 N. | 4 W. | Armentrout and others (1980) note that this rock is highly altered. |

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