

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Systematic paleontology and distribution of late Eocene
benthic foraminifers from northwestern Oregon
and southwestern Washington

by

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Open-File Report
81-109

This report is preliminary and has not been
reviewed for conformity with U.S. Geological Survey
editorial standards and stratigraphic nomenclature

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Introduction

The purpose of this report is to document the data used in "Paleoecological evaluation of late Eocene biostratigraphic zonations of the Pacific coast of North America" (McDougall, 1980). Two forms of documentation are presented: 1) systematic paleontology, and 2) faunal distribution charts. Sample localities and stratigraphic information were given in an earlier report (McDougall, 1979).

Since consistent application of zoological nomenclature and species concepts were important in resolving biostratigraphic problems considerable attention has been given to the systematic paleontology. Classification of the benthic foraminifers follows that of Loeblich and Tappan (1964). Classification of the planktic foraminifers is after Poore (personal commun., 1976). Synonymies given in the following section include reference to the original description and to pertinent West Coast studies. Illustrated specimens and assemblage slides are on file at the U.S. National Museum (USNM numbers are referenced). Slides borrowed from oil companies have been returned to the respective companies. The occurrence of specimens is listed at the end of the species discussion and the reader is referred to the appropriate faunal distribution chart and species' number on the chart.

The occurrence and abundance of species within the sections is indicated by the faunal distribution charts. Abundance is identified by the following symbols:

- R = rare, 1 specimen,
 F = few, 2-19 specimens,
 C = common, 20-49 specimens,
 A = abundant, >50 specimens,
 ? = questionable identification of a single or a few (less than 5) specimens.

Because of the large size, the faunal distribution charts have been divided into parts. The numerical citation refers to the vertical placement and the letter citation refers to the horizontal placement of the page within the distribution chart.

Order FORAMINIFERIDA Eichwald, 1830

Suborder TEXTULARIINA Delage and Herouard, 1896

Superfamily AMMODISCACEA Reuss, 1862

Family ASTORRHIZIDAE Brady, 1881

Subfamily RHIZAMMININAE Rhumbler, 1895

Genus BATHYSIPHON M. Sars, 1872

BATHYSIPHON EOCENICA Cushman and G. D. Hanna, 1927

Bathysiphon eocenica Cushman and G. D. Hanna, 1927, p. 210, pl. 13, figs. 2, 3.--Cushman, Stewart, and Stewart, 1947, p. 97, pl. 12, figs. 1, 2.--Wilson, 1954, p. 131, pl. 12, fig. 2.--Smith, 1957, p. 148, pl. 17, fig. 1.--Drugg, 1958, p. 58, pl. 1, fig. 2.--Hornaday, 1961, p. 178, pl. 1, fig. 2.--Lindquist, 1961, p. 66.--Hamlin, 1962, p. 47.--Sullivan, 1962, p. 249, pl. 1, figs. 2, 3.--Weaver, 1962, p. 369, pl. 1, fig. 3.--Weaver and Weaver, 1962, p. 18, pl. 1, fig. 5.--Weaver and Molander, 1964, p. 176, pl. 1, fig. 2.--Young, 1966, p. 98, pl. 10, fig. 1.--DeLise, 1967, p. 21.--Strong, 1967, p. 37, pl. 1, figs. 1, 2.--Fairchild and others, 1969, p. 29.--Smith, 1971, p. 23.--McDougall, 1972, p. 33, pl. 1, fig. 1.--Tipton and others, 1973, p. 40.--McDougall, 1980, pl. 1, fig. 1.

Discussion.--Tests of Bathysiphon eocenica are composed of white fine-grained material, firmly cemented into an elongate circular or ovate cylindrical shape. The outer wall is thick and in encrusted specimens surrounds a black organic filling. All specimens are fragments with lengths from 0.5 to

2.0 mm and widths between 0.3 and 0.7 mm. Longer specimens have constrictions at intervals of about 0.6 mm.

Bathysiphon eocenica is common throughout the entire time interval studied here and does not have any biostratigraphic or bathymetric significance.

Types and occurrence.--USNM 262205, Clatskanie well (42), Clark and Wilson well (46), Cooper Mountain well (24), Wolf Creek section (52), Rock Creek section (2), Willapa River section (37), Beaver Creek section (1).

BATHYSIPHON sp. A

Discussion.--The test is elongate, cylindrical and composed of quartz grains with a fine-grained cement. Specimens are usually crushed.

Types and occurrence.--Rock Creek section (99).

BATHYSIPHON sp. B

Discussion.--The test is elongate, cylindrical, and composed of angular, clear quartz grains and a fine-grained cement.

Types and occurrence.--Rock Creek section (3), Beaver Creek section (2).

BATHYSIPHON spp.

Discussion.--Poorly preserved fragments belong to this genus.

Types and occurrence.--Clatskanie well (54), Clark and Wilson well (1), Cooper Mountain well (58), Wolf Creek section (50), Rock Creek section (109), Willapa River section (2), Beaver Creek section (9).

Family SACCAMMINIDAE Brady, 1884
Subfamily SACCAMMININAE Brady, 1884
Genus PELOSINA Brady, 1879

Discussion.--These are ovate sacklike specimens which appear to belong to this genus.

Types and occurrence.--Clatskanie well (69).

Family AMMODISCIDAE Reuss, 1862
Subfamily AMMODISCINAE Reuss, 1862
Genus AMMODISCUS Reuss, 1862
AMMODISCUS INCERTUS (d'Orbigny, 1839)

Operculina incerta d'Orbigny, 1839, in Ramon de la Sagra, 1839, p. 49, pl. 6, figs. 16-17.

Cornuspira incerta (d'Orbigny) emend. Loeblich and Tappan, 1954, p. 308, tf. 1.

Ammodiscus cf. A. incertus (d'Orbigny).--Rau, 1951, p. 428, pl. 63, fig. 1.--Drugg, 1958, p. 60, pl. 1, fig. 4.--Kleinpell and Weaver, 1963, p. 166, pl. 2, fig. 6.--Weaver and Molander, 1964, p. 177, pl. 1, fig. 7.--McWilliams, 1965, p. 73-74, pl. 1, fig. 10.--Carlson, 1969, p. 12.--Smith, 1971, p. 24.

Ammodiscus incertus (d'Orbigny).--Weaver and Molander, 1964, p. 177, pl. 1, fig. 6.--DeLise, 1967, p. 21.--McDougall, 1972, p. 39, pl. 1, fig. 6.--McDougall, 1980, pl. 1, figs. 2-5.

Ammodiscus sp.--Wilson, 1954, p. 131, pl. 12, fig. 3.--Smith, 1956, p. 87, pl. 9, fig. 6.--McWilliams, 1965, p. 74, pl. 1, fig. 11.

Discussion.--The test is discoidal with an initial globular proloculus surrounded by a planispiral coil. In several well-preserved specimens, the coiling direction is abruptly rotated 90° after the first 2 to 3 whorls. The wall is composed of fine-grained arenaceous material and cement, which does not react with dilute hydrochloric acid. Except for fragmentation and partial pyritization, preservation of this species is usually excellent. Complete specimens range from 0.4 to 1.2 mm in diameter and rarely have more than 5 coils.

Types and occurrence.--USNM 262206, 262207, 262208, Clatskanie well (9), Clark and Wilson well (45), Wolf Creek section (49), Rock Creek section (171), Willapa River section (104).

Superfamily LITUOLACEA de Blainville, 1825

Family HORMOSINIDAE Haeckel, 1894

Subfamily HORMOSININAE Haeckel, 1894

Genus REOPHAX Montfort, 1808

REOPHAX PILULIFERA Brady, 1884

Reophax pilulifera Brady, 1884, p. 292, pl. 30, figs. 18- 20.--McDougall, 1972, p. 41, pl. 1, fig. 7.--McDougall, 1980, pl. 1, figs. 6, 7. Reophax sp.--Kleinpell and Weaver, 1963, p. 166, pl. 2, fig. 4a-b.

Discussion.--Specimens of this species characteristically have four chambers increasing rapidly in size. Tests vary in length from 0.6 to 1.3 mm. The wall is composed of coarse quartz grains and a fine-grained cement.

Types and occurrence.--USNM 262209, 262398, Rock Creek section (104), Willapa River section (148).

REOPHAX sp.

Discussion.--Preservation is poor. Chambers are indistinguishable.

Types and occurrence.--Clatskanie well (67), Rock Creek section (163), Willapa River section (154).

Family LITUOLIDAE de Blainville, 1825

Subfamily HAPLOPHRAGMOIDINAE Maync, 1952

Genus HAPLOPHRAGMOIDES Cushman, 1910

HAPLOPHRAGMOIDES DEFLATA Sullivan, 1962

Haplophragmoides deflata Sullivan, 1962, p. 251, pl. 1, figs. 11, 12.--
McDougall, 1972, p. 46, pl. 1, fig. 11.--McDougall, 1980, pl. 1, figs. 8-
10, pl. 2, figs. 1, 2.

Haplophragmoides cf. H. deflata Sullivan.--Strong, 1967, p. 40.

Discussion.--Adult specimens range in diameter from 0.3 to 0.9 mm.

Types and occurrence.--USNM 262210, 262211, Rock Creek section (85),
Willapa River section (34).

HAPLOPHRAGMOIDES sp.

Types and occurrence.--Willapa River section (136).

HAPLOPHRAGMOIDES spp.

Discussion.--These specimens are crushed, distorted, and poorly
preserved, therefore identification further than genus is impossible

Types and occurrence.--Clatskanie well (3), Clark and Wilson well (3),
Cooper Mountain well (14), Wolf Creek section (14), Rock Creek section (59),
Willapa River section (44).

Subfamily CYCLAMMININAE Marie, 1941

Genus CYCLAMMINA Brady, 1879

CYCLAMMINA INCISA (Stache, 1865)

Haplophragmium incisum Stache, 1865, p. 165, pl. 21, fig. 1.

Cyclammina incisa (Stache).--Cushman and Laiming, 1931, p. 93, pl. 9, fig. 6a-
b.--Cushman, Stewart, and Stewart, 1947, p. 12, pl. 1, fig. 1.--Mumby,
1959, p. 45, pl. 1, fig. 7a-b.--Kleinpell and Weaver, 1963, p. 167, pl.
2, fig. 11a-b.--DeLise, 1967, p. 23.--Strong, 1967, p. 47, pl. 1, figs.

14, 15.--Fairchild and others, 1969, p. 31.--Smith, 1971, p. 30.--Tipton and others, 1973, p. 41, pl. 1, fig. 2a-b.

Discussion.--Specimens assigned to this species differ from Cyclammina pacifica Beck because of the smoother finish, slightly coarser grained arenaceous material, and broader sutures. This species differs from Haplophragmoides deflata Sullivan in the finer grained arenaceous material and less lobate periphery.

Types and occurrence.--Clatskanie well (31), Clark and Wilson well (36), Rock Creek section (114).

CYCLAMMINA PACIFICA Beck, 1943

Cyclammina pacifica Beck, 1943, p. 591, pl. 98, figs. 2, 3.--Cushman, Stewart, and Stewart, 1947, p. 74, pl. 9, figs. 1, 2.--Rau, 1948, p. 157, pl. 27, figs. 7, 8.--Rau, 1951, p. 429, pl. 63, fig. 18.--Mumby, 1959, p. 46, pl. 1, fig. 8a-b.--Thoms, 1959, p. 60, pl. 1, fig. 5a-b.--Hornaday, 1961, p. 180, pl. 1, fig. 11a-c.--Kleinpell and Weaver, 1963, p. 167, pl. 3, fig. 1.--Strain, 1964, p. 59, pl. 1, figs. 9-10.--Weaver and Molander, 1964, p. 178, pl. 2, fig. 2a-b.--McWilliams, 1965, p. 77-78, pl. 2, fig. 5.--Young, 1966, p. 101.--McDougall, 1972, p. 53, pl. 1, fig. 13.--Tipton and others, 1973, p. 41.--McDougall, 1980, pl. 2, figs. 3, 4.

Discussion.--Specimens assigned to this species are present in all sections and are common in poorly preserved and altered faunas. Weathering enhances the coarseness of the surface by removing the outer fine-grained material. Pyrite commonly fills the interior of the test.

Types and occurrence.--USNM 262212, Clatskanie well (22), Clark and Wilson well (13), Cooper Mountain well (7), Wolf Creek section (36), Castor Creek section (19), Rock Creek section (10), Willapa River section (50), Beaver Creek section (4).

CYCLAMMINA sp. A

Discussion.--The test is slightly evolute, compressed, and composed of fine arenaceous material. The final whorl has 12-13 chambers and a rounded periphery. Sutures are depressed and radial.

Types and occurrence.--Rock Creek section (93).

CYCLAMMINA spp.

Discussion.--Specimens are poorly preserved. Identification below genus level is not possible.

Types and occurrence.--Clark and Wilson well (29), Wolf Creek section (53), Rock Creek section (69), Willapa River section (75), Beaver Creek section (10).

Family TEXTULARIIDAE Ehrenberg, 1838

Subfamily SPIROPECTAMMININAE Cushman, 1927

Genus SPIROPECTAMMINA Cushman, 1927

SPIROPECTAMMINA DIRECTA

(Cushman and Siegfus, 1939)

Spiropectoides directa Cushman and Siegfus, 1939, p. 26, pl. 6, figs. 7-8.

Spiropectamina directa (Cushman and Siegfus).--Fairchild and others, 1969, p. 31, pl. 1, fig. 10.--Strong, 1967, p. 48, pl. 1, fig. 16.--McDougall, 1980, pl. 2, fig. 5.

Spiropectamina grysowski Weaver and Weaver, (not Frizzell), 1962, p. 19, pl. 2, fig. 1.

Discussion.--Spiropectamina directa differs from other members of this genus because of nearly parallel sides, narrow test, and sutures which are slightly curved on the inner margin, but otherwise straight. Lengths ranges from 0.5 to 0.7 mm and widths ranges from 0.2 to 0.3 mm.

Types and occurrence.--USNM 262213, Willapa River section (101).

SPIROPECTAMMINA RICHARDI Martin, 1943

Spiropectamina richardi Martin, 1943, p. 104, pl. 5, fig. 3.--Weaver, 1962, p. 370.--Weaver and Molander, 1964, p. 178, pl. 2, fig. 5.--McDougall, 1980, pl. 2, figs. 6, 7.

Discussion.--Spiroplectamina richardi has a diamond-shaped outline in both the side and end views. The widest portion of the test occurs at a point one-half to three-quarters of the length above the base. Lengths ranging from 0.4 to 0.7 mm and maximum widths from 0.3 to 0.5 mm. Sutures are straight and at nearly 90° to the median line of the test. Six to nine chamber pairs are above the initial coil.

Types and occurrence.--USNM 262214, Willapa River section (87).

?SPIROPLECTAMMINA sp.

Discussion.--This specimen is broken and partially dissolved.

Types and occurrence.--Clatskanie well (29).

SPIROPLECTAMMINA TEJONENSIS Mallory, 1959

Spiroplectamina tejonensis Mallory, 1959, p. 118, pl. 3, figs. 6-8.--
McDougall, 1972, p. 57, pl. 2, fig. 1.--Tipton and others, 1973, p. 41,
pl. 1, fig. 4a-b.--McDougall, 1980, pl. 2, figs. 8, 9.

Discussion.--The extremely arcuate sutures and wide test distinguish this species. The length is 0.46 mm and the width is 0.5 mm. Seven chamber pairs are above the initial coil.

Type and occurrence.--USNM 262215, Willapa River section (157).

Subfamily TEXTULARIINAE Ehrenberg, 1838

Genus TEXTULARIA DeFrance, 1824

TEXTULARIA ADALTA Cushman, 1926

Textularia adalta Cushman, 1926, p. 29, pl. 4, fig. 2.--McDougall, 1980, pl. 2, figs. 10, 11.

Textularia cf. T. adalta Cushman.--Rau, 1948, p. 158, pl. 27, figs. 1, 2.

Discussion.--The proloculus and initial chambers of this species are small, thin and fragile whereas the adult portion is thicker and larger. The test commonly breaks at the intersection of these two test types and the juvenile portion is lost. The adult portion of the test comprises at least three-quarters of the entire test and ranges in length from 0.3 to 0.5 mm. The sides are nearly parallel and the width remains constant throughout the adult test. The adult test has 5 to 6 pairs of chambers.

Types and occurrence.--USNM 262216, Cooper Mountain well (35), Wolf Creek section (99), Castor Creek section (14), Rock Creek section (98), Willapa River section (119).

Family TROCHAMMINIDAE Schwager, 1877

Subfamily TROCHAMMINAE Schwager, 1877

Genus TROCHAMMINA Parker and Jones, 1859

TROCHAMMINA GLOBIGERINIFORMIS

(Parker and Jones, 1865)

Lituola globigeriniformis Parker and Jones, 1865, p. 407, pl. 15, figs. 46, 47.

Trochammina globigeriniformis (Parker and Jones).--Cushman and Jarvis, 1928, p. 95, pl. 13, fig. 12a, b.--Smith, 1971, p. 31.--McDougall, 1972, p. 59, pl. 2, fig. 9.--McDougall, 1980, pl. 2, figs. 12, 13, pl. 3, figs. 1-3.

Trochammina cf. T. globigeriniformis (Parker and Jones).-- Drugg, 1958, p. 71, pl. 2, fig. 20.--Bagley, 1959, p. 61.--Loney, 1961, p. 76, pl. 2, fig. 4a-b.--Hamlin, 1962, p. 57, pl. 2, fig. 4.--McWilliams, 1965, p. 84, pl. 2, fig. 10.

Discussion.--The test is of medium size, trochospirally coiled and frequently crushed. Four to six chambers comprise the last whorl. Chambers are globose and slightly overlapping. The last chamber comprises about one-third of the test. The wall is composed of medium- to fine-grained, clear (siliceous), arenaceous material and cement which does not react to hydro-

chloric acid. The aperture is interiomarginal, extraumbilical with a flaplike projection into the umbilical area. Maximum diameter is 0.8 mm.

Types and occurrence.--USNM 262217, 262218, Clatskanie well (34), Clark and Wilson well (44), Wolf Creek section (51), Rock Creek section (41), Willapa River section (36), Beaver Creek section (8).

TROCHAMMINA INFLATA (Montagu, 1808)

Nautilus inflatus Montagu, 1808, p. 81, pl. 18, fig. 3.

Discussion.--The test is small and composed of fine-grained arenaceous material. Chambers are inflated and overlapping with three to four in last whorl. This species differs from T. globigeriniformis because of the small size and greater overlap of chambers.

Types and occurrence.--Clatskanie well (60), Willapa River section (33).

TROCHAMMINA sp.

Discussion.--Specimens are poorly preserved.

Types and occurrence.--Rock Creek section (92), Willapa River section (79).

Genus BUDASHEVAELLA Loeblich and Tappan, 1964

BUDASHEVAELLA MULTICAMERATUS (Voloshinova, 1961)

Circus multicameratus Voloshinova, in Voloshinova and Budasheva, 1961, p. 201, pl. 7, fig. 6a, b, c; pl. 8, figs. 1a, b, c.

Budashevaella multicameratus (Voloshinova).--McDougall, 1972, p. 64, pl. 2, fig. 5.--McDougall, 1980, pl. 3, figs. 4, 5.

Discussion.--This species is easily distinguished from species of Haplophragmoides by the orientation of the inner whorls, 90° to final whorl, and the large number of chambers per whorl, usually 15.

Types and occurrences.--USNM 262219, 262220, Clatskanie well (21), Clark and Wilson well (47), Wolf Creek section (84), Rock Creek section (5), Willapa River section (85).

BUDASHEVAELLA cf. B. MULTICAMERATUS

(Voloshinova, 1961)

Discussion.--Specimens are poorly preserved but appear to belong to this species.

Types and occurrence.--Beaver Creek section (3).

BUDASHEVAELLA sp.

Budashevaella sp.--McDougall, 1980, pl. 3, fig. 6.

Discussion.--Specimens are similar to Budashevaella multicameratus (Voloshinova) but have coarser grained tests and fewer chambers.

Types and occurrence.--USNM 262221, Rock Creek section (148).

BUDASHEVAELLA spp.

Discussion.--Poorly preserved specimens.

Types and occurrence.--Willapa River section (78).

Family ATAXOPHRAGMIIDAE Schwager, 1877

Subfamily VERNEUILININAE Cushman, 1911

Genus GAUDRYINA D'Orbigny, 1839

GAUDRYINA ALAZAENSIS Cushman, 1936

Gaudryina (Pseudogaudryina) alazaensis Cushman, 1936, p. 14, pl. 2, fig. 17.

Gaudryina alazaensis Cushman.--Rau, 1948, p. 158, pl. 27, fig. 3, 4.--Rau, 1951, p. 429, pl. 63, fig. 12.--Mumby, 1959, p. 57.--McDougall, 1980, pl. 3, figs. 7- 12.

Gaudryina sp. A.--Cushman, Stewart, and Stewart, 1947, p. 74, pl. 11, fig. 1.

Gaudryina sp. B.--Cushman, Stewart, and Stewart, 1947, p. 74, pl. 11, fig. 2.

Discussion.--Specimens assigned to this species fall into two morphologic types: 1) a large triserial portion with one to two chambers of the biserial portion (McDougall, 1980, pl. 3, figs. 7, 8, 11, 12), and 2) a small triserial portion with three to four pairs of chambers in the biserial portion (McDougall, 1980, pl. 3, figs. 9, 10). The large triserial stage ranges from 0.3 to 0.5 mm while the small triserial stage is always less than 0.2 mm. The small triserial forms are almost entirely restricted to the Willapa River section which represents the middle bathyal facies. These variable morphologic types are interpreted as microspheric and megaspheric generations, but the environment may be influencing the test type or the preservation of the test type. These morphologic types may also represent two different species. The holotype and paratypes of this species have a large triserial stage and two chambers in the biserial stage.

Types and occurrence.--USNM 262222, 262223, 262224, Clark and Wilson well (95), Cooper Mountain well (11), Wolf Creek section (60), Rock Creek section (151), Willapa River section (109).

Subfamily GLOBOTEXTULARIINAE Cushman, 1927

Genus DOROTHIA Plummer, 1931

DOROTHIA PRINCIPIENSIS Plummer, 1931

Dorothia principiensis Cushman and Bermudez, 1936, p. 57, pl. 10, figs. 3-4.-- Drugg, 1958, p. 68, pl. 2, figs. 6, 7.--Bagley, 1959, p. 56.--Mallory, 1959, p. 125, pl. 27, fig. 8a-b, pl. 33, fig. 2a-b, pl. 36, fig. 3a-b.-- Lindquist, 1961, p. 72, pl. 1, fig. 9a-b.-- DeLise, 1967, p. 25, pl. 1, fig. 6a-b.--McDougall, 1972, p. 66, pl. 2, fig. 3.

Discussion.--Specimens assigned to this species are slightly smaller than the holotype and more coarsely arenaceous. The chambers are obscured by the arenaceous material and the preservation.

Types and occurrence.--Clark and Wilson well (51), Rock Creek section (100).

DOROTHIA sp. A

Dorothia sp. A.--McDougall, 1980, pl. 4, figs. 1, 2.

Discussion.--The test is multiserial at the base, rapidly becoming biserial. The cross section is round to oval, not triangular. Chambers are inflated and slightly overlapping. The aperture is an interiomarginal slit.

Specimens belonging to this species are common throughout the Washington and Oregon sections. Specimens assigned to the genus Verneuilina sp. by Fairchild and others (1969, p. 33, pl. 3, fig. 1) from California are probably the same species.

Types and occurrence.--USNM 262225, 262226, Clatskanie well (65), Clark and Wilson well (2), Rock Creek section (150), Willapa River section (120).

DOROTHIA sp. B

Discussion.--These specimens have a small multiserial stage (about one-fifth of the test) and an elongate biserial stage. The sides of the biserial stage are nearly parallel. The test is finely arenaceous. The aperture is obscured.

Types and occurrence.--Wolf Creek section (54), Rock Creek section (13).

?DOROTHIA sp.

Discussion.--Specimens are poorly preserved and questionably assigned to this genus.

Types and occurrence.--Rock Creek section (127).

Genus EGGERELLA Cushman, 1933

EGGERELLA cf. E. ELONGATA Blaisdell

Discussion.--Specimens are fragments.

Types and occurrence.--Willapa River section (15), Beaver Creek section (6).

EGGERELLA sp.

Eggerella sp.--McDougall, 1980, pl. 4, fig. 3.

Discussion.--The test is small, conical in shape, finely arenaceous, smoothly finished, and in these samples orange-brown in color. The chambers increase gradually in size and overlap. There are four chambers in the last whorl, five in the preceding, and the remaining are indistinguishable. The coiling pattern in the last whorl is similar to Arenobulimina but with fewer chambers. The aperture is a low interiomarginal slit. The length and maximum width are about equal ranging from 0.2 to 0.3 mm.

Types and occurrence.--USNM 262227, Willapa River section (153).

?EGGERELLA sp.

Discussion.--This specimen is a broken fragment that appears to be triserial and is questionably assigned to this genus.

Types and occurrence.--Rock Creek section (101), Willapa River section (143).

EGGERELLA SUBCONICA Parr, 1950

Eggerella subconica Parr, 1950, p. 281, pl. 5, fig. 22.--Weaver and Molander, 1964, p. 179, pl. 2, fig. 10a-b, pl. 3, fig. 1a-b.--Fairchild and others, 1969, p. 34.--McDougall, 1980, pl. 4, figs. 4, 5.

Eggerella subconica n. var. Blaisdell MS.--Weaver, 1962, p. 371, pl. 1, fig. 1a-c.

Eggerella subconica var. venturaensis Blaisdell.--DeLise, 1967, p. 24.

Arenobulimina(?) sp. Hornaday, 1961, p. 181, pl. 2, fig. 6a-d.

Tritaxilina? sp.--Strong, 1967, p. 50.

Discussion.--Specimens assigned to this species are usually crushed, but may occasionally be filled with pyrite. Specimens attain a maximum width of 0.4 mm.

Types and occurrence.--USNM 262228, 262229, Rock Creek section (82), Willapa River section (16).

?EGGERELLA SUBCONICA Parr, 1950

Discussion.--The preservation is poor, so that positive identification is not possible.

Types and occurrence.--Beaver Creek section (5).

Genus KARRERIELLA Cushman, 1933

KARRERIELLA CHAPAPOTENSIS MONUMENTENSIS

Mallory, 1959

KarrerIELla chapapotensis (Cole) var. monumentensis Mallory, 1959, p. 126, pl. 5, fig. 3a-c.--McDougall, 1980, pl. 4, fig. 6.

Discussion.--This species is identified by the distinctive biserial portion of the adult test. There are four pairs of chambers in the biserial portion. The test is smoothly finished arenaceous material. The length is 0.3 mm and the width is 0.24 mm.

Types and occurrence.--USNM 262230, Willapa River section (114).

KARRERIELLA WASHINGTONENSIS Rau, 1948

Karrerrella washingtonensis Rau, 1948, p. 158, pl. 27, figs. 5, 6.--Rau, 1951, p. 429, pl. 63, fig. 3.--Mumby, 1959, p. 48.--McDougall, 1980, pl. 4, figs. 7, 8.

Discussion.--These specimens fit well with the type description although the size range is greater. This species incorporates dark grains in the test wall which at times gives it a speckled appearance.

Types and occurrence.--USNM 262231, Clark and Wilson well (69), Cooper Mountain well (65), Wolf Creek section (15), Rock Creek section (120), Willapa River section (108).

KARRERIELLA sp.

Discussion.--Specimens are weathered and the chambers are broken so that assignment to species is difficult.

Types and occurrence.--Rock Creek section (168).

Subfamily VALVULININAE Berthelin, 1880

Genus MARTINOTTIELLA Cushman, 1935

MARTINOTTIELLA COMMUNIS (d'Orbigny, 1846)

Clavulina communis d'Orbigny, 1846, p. 196, pl. 12, figs. 1-2.--Fairchild and others, 1969, p. 34, pl. 4, fig. 10.

Martinottiella communis (d'Orbigny).--Smith, 1971, p. 35.--McDougall, 1980, pl. 4, figs. 9, 10.

Martinottiella byramensis (Cushman).--Bagley, 1959, p. 57, pl. 1, figs. 7, 8.--Mumby, 1959, p. 49, pl. 1, fig. 11.--McDougall, 1972, p. 70.

Martinottiella cf. M. byramensis (Cushman).--McWilliams, 1965, p. 80-81, pl. 1, fig. 12.

Discussion.--Test is smoothly finished and finely arenaceous; roughly conical in shape; followed by an elongate uniserial stage. The small multi-serial stage (U.2-0.5 mm) is slightly inflated. In the uniserial portion

chambers are added in a rectilinear fashion with chambers wider (0.2-0.25 mm) than long (0.12-0.16 mm). The aperture is simple, terminal and on a short neck.

Types and occurrence.--USNM 262232, Willapa River section (129), Beaver Creek section (7).

Suborder MILIOLINA Delage and Herouard, 1896

Superfamily MILIOLACEA Ehrenberg, 1839

Family FISCHERINIDAE Millett, 1898

Subfamily CYCLOGYRINAE Loeblich and Tappan, 1961

Genus CYCLOGYRA Wood, 1842

CYCLOGYRA BYRAMENSIS (Cushman, 1935)

Cornuspira byramensis Cushman, 1935, p. 27, pl. 4, figs. 4a-b.--Rau, 1948, p. 160, pl. 28, figs. 10, 11.

Cyclogyra byramensis (Cushman).--McDougall, 1980, pl. 5, figs. 1, 2.

Cyclogyra cf. C. byramensis (Cushman).--McDougall, 1972, p. 72, pl. 2, fig. 10.

Cornuspira lewisensis Beck, 1943, p. 594, pl. 101, figs. 4-5.

Discussion.--Beck (1943) cites the difference between Cyclogyra byramensis (Cushman) and C. lewisensis (Beck) as the size. Rau (1948), however, finds a range of sizes and therefore concludes:

"Some [specimens referable to C. byramensis Cushman] have a diameter more than four times that of the holotype, but others display a distinct size gradation to a diameter which is even less than that of the holotype. Beck described C. lewisensis from the Eocene of Washington as being distinct from C. byramensis in that it is more than twice as large. The extreme variation in size exhibited by the present specimens indicates that only one species is represented."

Specimens in this study area also show the diameter ranges from 0.4 to 1.4 mm and further confirms this synonym.

The chambers are commonly filled with pyrite or silica. The forms filled with pyrite retain their shape and characteristics longer than those filled with silica. Usually only fragments or the outer coil of the test are found.

Types and occurrence.--USNM 262233, Clatskanie well (23), Clark and Wilson well (94), Wolf Creek section (96), Rock Creek section (44), Willapa River section (59).

Family NUBECULARIIDAE Jones, 1875

Subfamily SPIROLOCULININAE Wiesner, 1920

Genus SPIROLOCULINA d'Orbigny, 1826

SPIROLOCULINA TEXANA Cushman and Ellisor, 1944

Spiroloculina texana Cushman and Ellisor, 1944, p. 51, pl. 8, fig. 14-15.--
Rau, 1948, p. 160, pl. 28, figs. 4, 5.--Rau, 1951, p. 430, pl. 63, fig. 5.--McDougall, 1980, pl. 5, figs. 3, 4, 8, 9.

Spiroloculina wilcoxensis Cushman and Garrett.--Hornaday, 1961, p. 181, pl. 2, fig. 3.--Sullivan, 1962, p. 257, pl. 4, fig. 9.--Weaver, 1962, p. 372.

Discussion.--Specimens assigned to this genus have 6-10 coils (12-20 chambers) visible. Sizes range from lengths of 0.4 to 0.7 mm, widths of 0.28 to 0.4 mm, and thicknesses of 0.06 to 0.08 mm.

Types and occurrence.--USNM 262234, 262236, 262237, Castor Creek section (29), Rock Creek section (78), Willapa River section (48).

Family MILIOLIDAE Ehrenberg, 1839

Subfamily QUINQUELOCULININAE Cushman, 1917

Genus QUINQUELOCULINA d'Orbigny, 1826

QUINQUELOCULINA GOODSPEEDI Hanna and Hanna, 1924

Quinqueloculina goodspeedi Hanna and Hanna, 1924, p. 58.--Rau, 1951, p. 429, pl. 63, figs. 6-8.--McDougall, 1972, p. 73, pl. 2, fig. 12.

Discussion.--The position of the aperture and the tooth distinguish this species from other species of Quinqueloculina.

All specimens of this species are small, ranging in length from 0.28 to 0.46 mm and from 0.16 to 0.28 in width.

Types and occurrence.--Clatskanie well (56), Cooper Mountain well (32), Wolf Creek section (67), Willapa River section (139).

QUINQUELOCULINA cf. Q. GOODSPEEDI

Hanna and Hanna, 1924

Discussion.--This differs from type by having an aperture which is distinctly closer to the suture.

Types and occurrence.--Rock Creek section (135).

QUINQUELOCULINA IMPERIALIS Hanna and Hanna, 1924

Quinqueloculina imperialis Hanna and Hanna, 1924, p. 58, pl. 13, figs. 7, 8, 10.--Rau, 1948, p. 159, pl. 27, figs. 12-14.--Rau, 1951, p. 429, pl. 63, fig. 13.--McDougall, 1980, pl. 5, figs. 11-13.

Discussion.--This is a large robust species which is easily identified. Complete specimens are common to sections representing neritic depths whereas fragments are common to the sections representing deeper water.

Types and occurrence.--USNM 262239, Clatskanie well (28), Clark and Wilson well (19), Cooper Mountain well (33), Wolf Creek section (68), Rock Creek section (38), Willapa River section (94).

QUINQUELOCULINA IMPERIALIS PORTERENSIS Rau, 1948

Quinqueloculina imperialis Hanna and Hanna var. porterensis Rau, 1948, p. 159, pl. 27, figs. 9-11.

Discussion.--These specimens lack an apertural tooth, however, due to the poor preservation this may not be a valid criterion for designating a sub-species.

Types and occurrence.--Rock Creek section (169).

QUINQUELOCULINA spp.

Discussion.--Broken, poorly preserved specimens are included here.

Types and occurrence.--Clatskanie well (19), Clark and Wilson well (33), Cooper Mountain well (69), Wolf Creek section (11), Castor Creek section (43), Rock Creek section (125), Willapa River section (89).

QUINQUELOCULINA WEAVERI Rau, 1948

Quinqueloculina weaveri Rau, 1948, p. 159, pl. 28, figs. 1-3.--Rau, 1951, p. 430, pl. 63, fig. 4.--McDougall, 1980, pl. 5, figs. 5-7.

Discussion.--This species is similar in appearance to Q. goodspeedi Hanna and Hanna. The position and dentition of the aperture differentiates the two species.

Types and occurrence.--USNM 262235, Clark and Wilson well (20), Wolf Creek section (94), Rock Creek section (123), Willapa River section (81).

Genus PYRGO Defrance, 1824

PYRGO LUPHERI Rau, 1948

Pyrgo lupheri Rau, 1948, p. 160, pl. 28, figs. 8-9.

Discussion.--Specimens from the Willapa River Section are not well preserved but do have the distinctive bifid tooth.

Types and occurrence.--Willapa River section (118).

Genus SIGMOILINA Schlumberger, 1887

SIGMOILINA TENUIS (Czjzek, 1848)

Quinqueloculina tenuis Czjzek, 1848, p. 149, pl. 13, figs. 31-34.

Sigmoilina tenuis (Czjzek).--Cushman, 1946, p. 32, pl. 5, figs. 13-15.--Rau, 1951, p. 430, pl. 63, fig. 2.--McDougall, 1980, pl. 5, fig. 10.

Discussion.--The single specimen from the Willapa River section exhibits the distinctive quinqueloculine coil pattern but is smaller than the specimens described by Cushman (1946) and Rau (1951). The front view contains only 1 1/2 whorls (3 chambers) surrounding the inner whorls rather than 3-4 as the above authors illustrate. The length is 0.42 mm, width 0.28 mm, and thickness 0.04 mm.

Types and occurrence.--USNM 262238, Willapa River section (140).

Subfamily MILIOLINELLINAE Vella, 1957

Genus BILOCULINELLA Wiesner, 1931

BILOCULINELLA COWLITZENSIS Beck, 1943

Biloculinella cowlitzensis Beck, 1943, p. 594, pl. 101, figs. 6-7.--Rau, 1948, p. 160, pl. 28, figs. 6, 7.--McDougall, 1972, p. 76, pl. 2, fig. 11.

Discussion.--This species is rare and found only in the Willapa River section. The apertural characteristics distinguish it from other species. In some specimens the tooth has been removed but a scar at the point of attachment remains. These specimens are small; length ranges from 0.3 to 0.46 mm and the width from 0.3 to 0.4 mm.

Types and occurrence.--Willapa River section (130).

Suborder ROTALIINA Delage and Herouard, 1896

Superfamily NODOSARIACEA Ehrenberg, 1838

Family NODOSARIIDAE Ehrenberg, 1838

Subfamily NODOSARIINAE Ehrenberg, 1838

Genus NODOSARIA Lamarck, 1812

NODOSARIA DELICIAE Martin, 1943

Nodosaria deliciae Martin, 1943, p. 107, pl. 6, fig. 3.--Smith, 1957, p. 167, pl. 22, fig. 18a-b.--Drugg, 1958, p. 82, pl. 3, fig. 26.--McDougall, 1972, p. 79.--McDougall, 1980, pl. 6, fig. 1.

Discussion.--Only one chamber was found, however, the characteristic ornamentation is present.

Types and occurrence.--USNM 262240, Rock Creek section (26).

NODOSARIA LATEJUGATA Gumbel, 1868

Nodosaria latejugata Gumbel, 1868, p. 619, pl. 1, fig. 32.--Smith, 1957, p. 167, pl. 22, fig. 23.--Mallory, 1959, p. 171, pl. 13, fig. 20, pl. 28, fig. 8, pl. 41, fig. 1.--Weaver and Weaver, 1962, p. 28, pl. 7, figs. 15, 16.

Discussion.--Fragments of a large heavily costate test which is typical of this species were found. Chambers are wider than long and nearly obscured by the costate.

Types and occurrence.--Cooper Mountain well (18).

NODOSARIA LONGISCATA d'Orbigny, 1846

Nodosaria longiscata d'Orbigny, 1846, p. 32, pl. 1, figs. 10-12.--Drugg, 1958, p. 83, pl. 3, fig. 29.--Bagley, 1959, p. 72, pl. 3, fig. 23.--Carroll, 1959, p. 57.--Mallory, 1959, p. 171.--Hamlin, 1962, p. 68, pl. 4, fig. 7.--Weaver and Molander, 1964, p. 184, pl. 6, fig. 5.--McWilliams, 1965, p. 90.--McDougall, 1972, p. 80.--McDougall, 1980, pl. 6, fig. 2.

Nodosaria longiscata? d'Orbigny.--Carlson, 1969, p. 18.

Nodosaria cf. N. longiscata d'Orbigny.--Weaver and Weaver, 1962, p. 28, pl. 7, fig. 17.--Strong, 1967, p. 65.

Nodosaria arundinea Schwager.--Weaver, 1962, p. 376, pl. 2, fig. 14.

Discussion.--The major difference between the species N. arundinea Schwager and N. longiscata d'Orbigny appears to be the length and width of the chambers. In accordance with West Coast usage, N. arundinea refers to specimens with short, inflated chambers and N. longiscata refers to the narrower, longer chambered forms. The type illustrations do not show this degree of variation, and therefore examination of the holotypes may show that these species are synonyms.

For this study the specimens assigned to the species N. longiscata have narrow elongated chambers with widths of 0.08 to 0.12 mm. The length, however, is unknown because all the specimens are broken and consist of one or two chambers. Pyrite or silica fillings are common. Siliceous molds of this species sponge spicules and echinoid spines are indistinguishable. This species is common throughout all sections.

Types and occurrence.--USNM 262241, Clark and Wilson well (53), Cooper Mountain well (40), Wolf Creek section (65), Castor Creek section (10), Rock Creek section (27), Willapa River section (45).

NODOSARIA PYRULA d'Orbigny, 1826

Nodosaria pyrula d'Orbigny, 1826, p. 253.--Parker, Jones, and Brady, 1871, pl. 9, fig. 37, fig. b, after Soldani.--Cushman and Schenck, 1928, p. 308, pl. 43, figs. 1, 2.--Bagley, 1959, p. 73, pl. 3, fig. 24.--Mallory, 1959, p. 172, pl. 13, fig. 19, pl. 41, fig. 2.--Lindquist, 1961, p. 90, pl. 3, fig. 15.--Hornaday, 1961, p. 185, pl. 4, fig. 6.--Sullivan, 1961, p. 265, pl. 10, figs. 3a-b, 4a-b.--Hamlin, 1962, p. 69, pl. 4, figs. 8-9.--Weaver and Weaver, 1962, p. 28, pl. 7, fig. 18.--Kleinpell and Weaver, 1963, p. 171, pl. 7, figs. 5, 6.--Strain, 1964, p. 69, pl. 3, fig. 11.--Weaver and Molander, 1964, p. 185, pl. 6, fig. 17.--Fairchild and others, 1969, p. 37, pl. 4, fig. 12.--McDougall, 1972, p. 82, pl. 3, fig. 2.--McDougall, 1980, pl. 6, fig. 3.

Nodosaria pyrula? d'Orbigny.--Drugg, 1958, p. 83, pl. 3, fig. 30.

?Nodosaria pyrula d'Orbigny.--Carlson, 1969, p. 18.

Discussion.--Specimens examined from the type collections at the U.S. National Museum have flask-shaped individual chambers tapering to a connecting elongate neck and are oval to circular in cross section. Those included in this study include this variety as well as more spherical forms which probably represent a different species.

Types and occurrence.--USNM 262242, 262401, Clark and Wilson well (79), Wolf Creek section (82), Rock Creek section (28), Willapa River section (61).

NODOSARIA cf. N. PYRULA d'Orbigny, 1826

Discussion.--Poorly preserved fragments which have the shape and size of this species are included.

Types and occurrence.--Castor Creek section (24).

NODOSARIA sp.

Discussion.--Fragments of Nodosaria were found which vaguely resemble N. deliciae Martin. The chambers are longer than wide, costated and the costae are fairly regularly spaced. The costae are irregularly shaped with calcite buildups along their length so that they resemble candle drippings.

Types and occurrence.--Clark and Wilson well (70).

NODOSARIA spp.

Discussion.--Fragments and siliceous molds which cannot be identified to species.

Types and occurrence.--Clatskanie well (55), Clark and Wilson well (49), Cooper Mountain well (43), Wolf Creek section (9), Castor Creek section (25), Rock Creek section (87), Willapa River section (9).

Genus DENTALINA Risso, 1826

DENTALINA COCOAENSIS (Cushman, 1925)

Nodosaria cocoaensis Cushman, 1925, p. 66.

Dentalina cocoaensis (Cushman).--McDougall, 1980, pl. 6, fig. 4.

Discussion.--This species can be differentiated from others in the genus by the squarish but slightly rectangular, straight-sided chambers, straight sutures, gently curving test, basal spine and nearly centrally located aperture. This species differs from D. cooperensis Cushman because of the squarish chambers that are slightly elongated perpendicular to the direction of growth, a wider, straighter test and an offset aperture.

Except for the smaller size and absence of a basal spine, Dentalina colei bears many characters similar to D. cocoaensis. This may be a reflection of the relations between the megalos- and microspheric generations.

Dentalina cocoaensis is common throughout most sections. Although it is always broken, the test surface is usually well preserved.

Types and occurrence.--USNM 262243, Clatskanie well (13), Clark and Wilson well (57), Cooper Mountain well (8), Wolf Creek section (56), Castor Creek section (4U), Rock Creek section (11), Willapa River section (76).

DENTALINA COMMUNIS (d'Orbigny, 1826)

Nodosaria (Dentalina) communis d'Orbigny, 1826, p. 254.

Dentalina communis d'Orbigny.--Cushman and Schenck, 1928, p. 307, pl. 42, fig. 8.--Rau, 1948, p. 166, pl. 29, fig. 2.--Weaver and Weaver, 1962, p. 26, pl. 7, fig. 6.

Discussion.--Test small, arcuate, chambers globose, sutures depressed and angled. Specimens assigned to this species can be distinguished from other species of Dentalina by the arcuate test and angled sutures. Both complete and broken specimens occur in the study samples.

Types and occurrence.--Clatskanie well (64), Wolf Creek section (57),
Castor Creek section (38), Rock Creek section (94), Willapa River (133).

DENTALINA CONSOBRINA d'Orbigny, 1846

Dentalina consobrina d'Orbigny, 1846, p. 46, pl. 2, figs. 1-3.--Smith, 1956,
p. 90, pl. 11, fig. 1.--Sullivan, 1961, p. 263, pl. 9, fig. 2, 3a-c.--
Kleinpell and Weaver, 1963, (in part) p. 170, pl. 7, fig. 3.--McDougall,
1980, pl. 6, figs. 5-7.

Nodosaria (Dentalina) consobrina Cushman and G. D. Hanna, 1927, p. 214, pl.
13, figs. 12, 13.

Nodosaria consobrina (d'Orbigny).--Smith, 1957, p. 166, pl. 22, figs. 16, 17.

Discussion.--This species can be recognized by the straight sutures,
nearly straight test, and chamber shapes. The bulbous proloculus is followed
by a square second chamber. The following chambers are three times as long as
wide and nearly spherical.

Types and occurrence.--USNM 262244, Rock Creek section (12), Willapa
River section (123).

DENTALINA DUSENBURYI Beck, 1943

Dentalina duseburyi Beck, 1943, p. 599, pl. 105, figs. 20, 23.--Rau, 1948, p.
167, pl. 30, fig. 24.--Smith, 1956, p. 90, pl. 11, fig. 6.--Weaver and
Molander, 1964, p. 184, pl. 6, fig. 14.--DeLise, 1967, p. 31, pl. 2, fig.
11.--McDougall, 1972, p. 89, pl. 3, fig. 5.--McDougall, 1980, pl. 6,
figs. 8-10.

Types and occurrence.--USNM 262245, 262246, Clark and Wilson well (92),
Wolf Creek section (58), Rock Creek section (126), Willapa River section (93).

DENTALINA cf. D. DUSENBURYI Beck

Discussion.--A single initial chamber was recovered which appears to have
costae between the chambers.

Types and occurrence.--Clatskanie well (38).

DENTALINA JACKSONENSIS Cushman and Applin, 1926

Dentalina jacksonensis Cushman and Applin, 1926, p. 170, pl. 7, fig. 14-16.

Dentalina consobrina d'Orbigny?--Cushman and Schenck, 1928, p. 308, pl. 42, figs. 9-11.

Discussion.--Chambers inflated and globose, test straight and sutures slightly depressed and straight. This species differs from Dentalina consobrina d'Orbigny by having less constricted sutures. The width and length of the chambers is about the same in D. jacksonensis. The inflated chambers differentiate this species from D. cocoaensis.

Types and occurrence.--Clatskanie well (37), Clark and Wilson well (64), Cooper Mountain well (9), Wolf Creek section (12), Rock Creek section (95), Willapa River section (88).

DENTALINA cf. D. OBLIQUISUTURATA Stache, 1865

Discussion.--Test is small, with parallel sides, strongly angled sutures, and four chambers in the single specimen found. This differs from the type by the parallel sides and an inflated final chamber.

Types and occurrence.--Wolf Creek section (74).

DENTALINA SOLUTA Reuss, 1851

Dentalina soluta Reuss, 1851, p. 60, pl. 3, fig. 4a-b.--Mallory, 1959, p. 167, pl. 13, fig. 1, pl. 28, fig. 4.--McDougall, 1972, p. 90, pl. 3, fig. 7.--McDougall, 1980, pl. 6, fig. 11.

Discussion.--Specimens assigned to this species consist of fragments of one to three chambers arranged in a rectilinear fashion. Chambers are smooth, spherical and about 0.25 mm in diameter. The sutures are depressed, wide and often form necks between the chambers. The sutures are very weak and do not support much pressure. Silica and pyrite molds are common.

Types and occurrence.--USNM 262247, Willapa River section (98).

DENTALINA SPINOSA d'Orbigny, 1846

Dentalina spinosa d'Orbigny, 1846, p. 55, pl. 2, figs. 36- 37.--Mallory, 1959, p. 167, pl. 12, fig. 26.--Sullivan, 1961, p. 264, pl. 9, figs. 17a-b, 18.--Kleinpell and Weaver, 1963, p. 170, pl. 6, figs. 8, 10, 11.

Discussion.--Chambers are at least twice as long as wide. Sutures are slightly depressed. The test wall is covered with numerous small bulbous calcite deposits which are probably the basal ends of the spines. No complete specimens were found. Chambers are 0.4 mm long and 0.14 mm wide and filled with silica.

Types and occurrence.--Clark and Wilson well (97).

DENTALINA cf. D. SPINOSA d'Orbigny, 1846

Discussion.--Specimens are amber colored and worn. There is evidence of calcareous mounds on the test, which may have been either costae or the basal part of spines.

Types and occurrence.--Willapa River section (146).

DENTALINA spp.

Discussion.--Siliceous molds and poorly preserved specimens which cannot be identified further than genus.

Types and occurrence.--USNM 262420, Clatskanie well (71), Rock Creek section (45), Willapa River section (70).

Genus FRONDICULARIA DeFrance, 1826

FRONDICULARIA sp.

Frondicularia sp.--McDougall, 1980, pl. 6, fig. 12.

Discussion.--Fragments identifiable to genus were found in two sections. Chambers are strongly arched and low. These fragments may belong to the species F. tenuissima Hantken (Fairchild and others, 1969, p. 39, pl. 15, fig. 16), however, a more complete specimen is needed to establish the relationship.

Types and occurrence.--USNM 262248, Clark and Wilson well (68), Wolf Creek (109).

Genus LAGENA Walker and Jacob, 1798

LAGENA BECKI Sullivan, 1962

Lagena becki Sullivan, 1962, p. 266, pl. 10, fig. 16a-b.--Carlson, 1969, p. 16.--Smith, 1971, p. 39, pl. 5, fig. 3.--McDougall, 1972, p. 93, pl. 3, fig. 10.--McDougall, 1980, pl. 7, figs. 1, 4.

Lagena sp. A Beck, 1943, p. 602, pl. 107, fig. 26.--Carroll, 1959, p. 59, pl. 1, fig. 10.

Lagena sp. Cushman and Schenck, 1928, p. 309, pl. 43, fig. 3.--Smith, 1956, p. 92, pl. 14, fig. 4a-b.

Discussion.--Numerous fine striations distinguish this from other species in this genus. Specimens range in size from 0.2 to 0.3 mm.

Types and occurrence.--USNM 262249, Clatskanie well (50), Wolf Creek section (79), Rock Creek section (46), Willapa River section (106).

LAGENA COSTATA (Williamson, 1858)

Entosolenia costata Williamson, 1858, p. 9, pl. 1, fig. 18.

Lagena costata (Williamson).--McDougall, 1980, pl. 7, figs. 2, 5.

Discussion.--The test is spherical; the wall is calcareous, finely perforate and ornamented with well-defined costae. Seven major costae radiate from a basal ring, cover the test at evenly spaced intervals and continue up onto the neck. Minor costae occur between the major costae only on the middle

half of the test. Specimens are small, 0.2 mm in diameter. These specimens differ from the Holocene specimens by not having a smooth collar around the neck.

Types and occurrence.--USNM 262250, Clatskanie well (40), Clark and Wilson well (77), Cooper Mountain well (52), Wolf Creek section (75), Rock Creek section (18), Willapa River section (51).

LAGENA cf. L. COSTATA (Williamson, 1858)

Discussion.--This specimen has fewer costae than typical and is poorly preserved but does resemble L. costata.

Types and occurrence.--Wolf Creek section (30).

LAGENA HEXAGONA (Williamson, 1848)

Entosolenia squamosa (Montagu) var. γ hexagona Williamson, 1848, p. 20, pl. 2, fig. 23.--Sullivan, 1961, p. 267, pl. 10, fig. 9a-b.

Lagena hexagona (Williamson).--McDougall, 1980, pl. 7, figs. 3, 6.

Discussion.--The test is spherical to ovate in outline. The surface is ornamented with numerous hexagonal reticulations, giving the test a honey-combed appearance. The specimens are 0.2 to 0.26 mm in diameter.

Types and occurrence.--USNM 262251, Clark and Wilson well (86), Cooper Mountain well (62), Wolf Creek section (88), Castor Creek section (50), Rock Creek section (156), Willapa River section (124).

LAGENA SEMISTRIATA Williamson, 1848

Lagena striata (Montagu) var. β semistriata Williamson, 1848, p. 14, pl. 1, figs. 9-10.

Lagena semistriata Williamson.--McDougall, 1980, pl. 7, figs. 7, 8.

Discussion.--The test is ovate in outline roughly twice as long as wide. The surface of the test is ornamented with seven narrow costae. The costae cover 1/2 to 3/4 of the test but do not extend to the neck region.

Types and occurrence.--USNM 262252, Eugene section (9), Wolf Creek section (110), Rock Creek section (162), Willapa River section (18).

LAGENA sp.

Discussion.--The test is smooth and pear shaped. There is no well-defined neck, instead the test slopes upward to the aperture.

Types and occurrence.--Willapa River section (158).

LAGENA VULGARIS Williamson, 1858

Orthocera perfecte globularia Soldano, 1780, Saggio Oritografico, fig. 43, H.

Serpula sulcata Adams, 1787, Micros. Essays, p. 634, tab. XIV, fig. 5.

Oolina laevigata d'Orbigny, 1847, Voyage dans l'Amerique meridionale, v. V, p. 18, tab. V, fig. 3.

Oolina striaticollis d'Orbigny, 1847, Voyage dans l'Amerique meridionale, v. V, p. 18, tab. V, fig. 14.

Lagena vulgaris Williamson, 1858, p. 3, pl. 1, figs. 5, 5a.--Thoms, 1959, p. 74, pl. 3, fig. 12a-b.--Sullivan, 1961, p. 267, pl. 10, figs. 12a-b, 13.--Hamlin, 1962, p. 71.--McWilliams, 1965, p. 93, pl. 3, fig. 7.--Young, 1966, p. 108.--McDougall, 1972, p. 94, pl. 3, fig. 11. Lagena sp. Cushman and Schenck, 1928, p. 309, pl. 43, fig. 5.

Discussion.--Specimens with two types of morphology are lumped into this species. Both are spherical in outline, have a roughly textured test and range in size from 0.2 to 0.3 mm. The difference between the two morphologies is the presence or absence of a neck. Some specimens have a slender well-defined neck, whereas in the others the test slopes gently up to the aperture. With further study these will probably prove to be two distinct species.

Types and occurrence.--Clark and Wilson well (78), Wolf Creek section (24), Rock Creek section (19), Willapa River section (134).

Genus LENTICULINA Lamarck, 1804

LENTICULINA BUDENSIS (Hantken, 1875)

Robulina budensis Hantken, 1875, p. 49, pl. 7, fig. 1.

Robulus budensis (Hantken).--Rau, 1948, p. 161, pl. 28, figs. 12, 13.

Discussion.--The single specimen present closely resembles Rau's illustration. The test is completely involute, 7 chambers in final whorl with gently curved sutures and a diameter of 0.60 mm. The chambers are globose and inflated. The periphery is keeled and lobate. The inflated chambers and depressed sutures distinguish this species from others.

Types and occurrence.--Cooper Mountain well (63).

LENTICULINA CHEHALISENSIS (Rau, 1948)

Robulus chehalisensis Rau, 1948, p. 162, pl. 29, fig. 14- 15.--Rau, 1951, p. 431, pl. 64, fig. 25.--McDougall, 1980, pl. 7, figs. 9, 10.

Discussion.--Several specimens are close to those figured by Rau. These specimens have 10 to 13 chambers and increase gradually in size by becoming longer rather than wider, therefore maximum diameters range from 1.50 to 1.70 mm while minimum diameters range from 1.20 to 1.60 mm. The sutures are flush and slightly curved. The keel is not well defined.

Another group of specimens have diameters less than 1 mm, but still have 10 to 13 chambers in the final whorl. The chamber shape is slightly different from the larger specimens, i.e., they are shorter while maintaining about the same width. The keel is better defined. Subsequent study may prove these to be a separate species.

Types and occurrence.--USNM 262253, Wolf Creek section (62), Rock Creek section (20).

LENTICULINA CRASSA (d'Orbigny, 1846)

Cristellaria crassa d'Orbigny, 1846, p. 90, pl. 4, figs. 1-3.

Lenticulina cf. L. crassa (d'Orbigny).--Kleinpell and Weaver, 1963, p. 169, pl. 5, fig. 8a-b.

Robulina deformis Reuss, 1851, p. 70, pl. 4, fig. 30.--Weaver, 1962, p. 22, pl. 3, figs. 6a-b, 7a-b.--Weaver and Molander, 1964, p. 181, pl. 4, fig. 4a-b.

Robulus cf. R. deformis (Reuss).--Sullivan, 1962, p. 258, pl. 7, fig. 7a-b.

Robulina kincaidi Beck, 1943, p. 595, pl. 102, figs. 1, 7.--Sullivan, 1962, p. 259, pl. 7, fig. 4a-b.

Robulus aff. R. kincaidi Beck.--Smith, 1957, p. 158, pl. 20, fig. 6a-b.

Robulus spp. (in part) Smith, 1957, p. 160, pl. 21, fig. 3.

Discussion.--This group of species represents a series of growth stages and probably also a reflection of the mega- and microspheric generations. Forms with a proloculus and one chamber have been frequently referred to Lenticulina deformis (Reuss). The two- and three-chambered forms have been referred to Lenticulina crassa (d'Orbigny). The four- and five-chambered forms are usually referred to the species Lenticulina kincaidi (Beck).

The proloculus is large and bulbous in the megaspheric forms. The coiling is involute. Chambers increase gradually in size as added and the sutures are strongly curved. The first apertural face rests entirely on the proloculus and is shaped like an equilateral triangle. The subsequent apertural faces are shaped like isosceles triangles; each new one increasing in height. Chambers are few, not more than 5 to 6, and there is never more than one whorl per test. The test has a keel which becomes more prominent on the later chambers.

The microspheric form is not recognized in the one-, two-, or three-chambered forms. The four- or five-chambered forms are smaller but identical to their megaspheric counterparts.

Types and occurrence.--USNM 262403, 262404, Clatskanie well (32), Clark and Wilson well (58), Cooper Mountain well (67), Wolf Creek section (7), Rock Creek section (47), Willapa River section (113).

LENTICULINA INORNATA (d'Orbigny, 1846)

Robulina inornata d'Orbigny, 1846, p. 102, pl. 4, figs. 25, 26.

Robulus inornata (d'Orbigny).--Cushman and Schenck, 1927, p. 307, pl. 42, fig. 3a-b.

Robulus inornatus (d'Orbigny).--Wilson, 1954, p. 134, pl. 13, fig. 6a-b.--Smith, 1957, p. 157, pl. 20, figs. 7a-b, 8a-b, 9a-b, 10a-b, 11a-b.--Drugg, 1958, p. 74, pl. 2, figs. 31-32.--Thoms, 1959, p. 65, pl. 2, fig. 4a-b.--Hornaday, 1961, p. 183, pl. 2, fig. 5a-b.--Lindquist, 1961, p. 80.--Hamlin, 1962, p. 61.--Sullivan, 1962, p. 258, pl. 5, fig. 5a-b.--Weaver and Molander, 1964, p. 181, pl. 4, figs. 6a-b, 7a-b.--Young, 1966, p. 105.

Cristellaria inornata Sherborn and Chapman, 1886, p. 754, pl. 15, figs. 27a-b.--Cushman and G. D. Hanna, 1927, p. 217, pl. 14, fig. 5.

Lenticulina inornata (d'Orbigny).--Fairchild and others, 1969, p. 42, pl. 6, fig. 1.--Tipton and others, 1973, p. 45, pl. 2, fig. 9a-b.--McDougall, 1980, pl. 7, figs. 11, 12.

Robulus alatolimbatus (Gumbel).--Wilson, 1954, p. 133, pl. 14, fig. 13a-b.--Smith, 1957, p. 156, pl. 20, fig. 1a-b.--Hornaday, 1961, p. 182, pl. 2, figs. 11a-b, 12a-b, 13a-b.

Discussion.--This species varies considerably. In this study, specimens assigned to this species are usually smaller than the type but range up to 0.7 mm in size. The width of the umbo is about 1/4 the diameter of the test and does not protrude. Each succeeding whorl significantly increases the size of the test. There can be up to 10 chambers per whorl. The sutures are straight and tangent to the umbo. In larger specimens the sutures begin to curve slightly.

Types and occurrence.--USNM 262254, Eugene section (2), Clatskanie well (5), Clark and Wilson well (4), Cooper Mountain well (15), Wolf Creek section (16), Castor Creek section (8), Rock Creek section (22), Willapa River section (8).

LENTICULINA cf. L. INORNATA (d'Orbigny, 1846)

Discussion.--Sutures on these specimens are more curved than in the species L. inornata.

Types and occurrence.--Rock Creek section (86).

LENTICULINA LIMBOSA (Reuss, 1863)

Cristellaria (Robulina) limbosa Reuss, 1863 (1864), p. 55, pl. 6, figs. 69a, b.--Hantken, 1875 (1876), p. 48, pl. 6, fig. 11.--Hantken, 1875 (1881), p. 57, pl. 6, fig. 11.

Robulus limbosus Ellisor, 1933, pl. 2, figs. 1a, b.

Robulus limbosus (Reuss).--Cushman, 1935, p. 16, pl. 6, fig. 5.--Mumby, 1959, p. 60, pl. 2, fig. 11a-b.

Discussion.--This species is differentiated from the variety by the smaller sutures, and from other species by the nearly straight sutures.

Types and occurrence.--Rock Creek section (72).

LENTICULINA LIMBOSA HOCKLEYENSIS

(Cushman and Applin, 1926)

Cristellaria limbosa (Reuss) hockleyensis Cushman and Applin, 1926, p. 171, pl. 8, figs. 3, 4.

Robulus limbosus (Reuss) hockleyensis Ellisor, 1933, pl. 1, figs. 11a, b.--Cushman, 1935, p. 16, pl. 4, figs. 15a, b, pl. 6, figs. 3a, b.--Rau, 1948, p. 162, pl. 29, figs. 11, 12.

Lenticulina limbosus hockleyensis (Cushman and Applin).--Smith, 1956, p. 89, pl. 10, fig. 5a-b.

Robulus cf. R. limbosus (Reuss) var. hockleyensis (Cushman and Applin).--
Wilson, 1954, p. 134, pl. 14, fig. 1a- b.

Discussion.--Specimens assigned to this species have little to no umbo; chambers globose; 7 to 8 in number; and in some specimens coiling is evolute.

Types and occurrence.--Clatskanie well (53), Cooper Mountain well (42), Wolf Creek section (39), Castor Creek section (22), Rock Creek section (73), Willapa River section (52).

LENTICULINA LINCOLNENSIS (Rau, 1948)

Robulus lincolnensis Rau, 1948, p. 161, pl. 28, figs. 14, 15.

Discussion.--The oldest Keasey specimens have straight sutures radiating from a central point, a narrow keel, and no umbo. None of the specimens have a well enough preserved apertural face to examine the associated characteristics. The specimens gradually change upward in the section: the size increases, the periphery becomes slightly lobate, and the sutures show more curvature. The large specimens are always crushed.

Types and occurrence.--USNM 262402, Cooper Mountain well (16), Wolf Creek section (63), Rock Creek section (121), Willapa River section (53).

LENTICULINA cf. L. LINCOLNENSIS (Rau, 1948)

Discussion.--This differs from the type by having more curvature in the suture and a less distinct keel.

Types and occurrence.--Clatskanie well (75).

LENTICULINA NIKOBARENSIS (Schwager, 1866)

Cristellaria nikobarensis Schwager, 1866, p. 243, pl. 6, fig. 87.

Robulus nikobarensis (Schwager).--Rau, 1951, p. 432, pl. 64, figs, 4, 5.

Discussion.--Little to no umbo; sutures spiral backward from the center; 9 chambers in the last whorl; keel.

Types and occurrence.--Rock Creek section (103).

LENTICULINA cf. L. PSEUDOROTULATA (Asano, 1938)

Lenticulina cf. L. pseudorotulata (Asano).--Fairchild and others, 1969, p. 42, pl. 6, fig. 3a-b.--McDougal, 1980, pl. 7, figs. 13, 14.

Discussion.--These specimens have an involutely coiled, finely perforate, calcareous test. The test has a large umbo, 1/2 to as much as 3/4 of the total diameter of the test. The umbo protrudes above the surface of the test by an abrupt change of angle seen in peripheral view. There are 6 to 9 chambers in the final whorl which increase gradually in size. Each whorl adds very little to the diameter of the test because the height of the new whorl above the preceding whorl's peripheral edge is very small. Sutures are flush with the surface of the test and seem to spiral backward around the umbo.

These specimens resemble Robulus pseudorotulatus Asano, 1938, from the Miocene and Pliocene of Japan. Specimens of this species examined at the U.S. National Museum (Cushman Collection numbers 59558, 547519, 58590) have the prominent umbo but it is usually only 1/4 of the test diameter. Also most specimens are smoothly angled (gently sloped) to the flat umbo and only rare specimens have the sharp angles at the edge of the umbonal region. Sutures are flush with the test wall and coil about the umbo at a very low angle. There are 8 to 10 chambers per whorl and the height above the preceding whorl is not great. Also, the large size of the Japanese specimens, 3 mm versus less than 1 mm, differentiates them from the East Pacific margin specimens.

Other species which are similar to those found in this study include Lenticulina rotulata (Lamarck) and Lenticulina gyrosalprum (Stache). Both species are larger, increase more rapidly in size, and sutures are more strongly coiled around the umbo than in the specimens collected in this study.

Types and occurrence.--USNM 262255, Clatskanie well (44), Wolf Creek section (31), Rock Creek section (21).

LENTICULINA sp. A

Discussion.--These specimens are strongly biconvex, have no umbo, and have 7 chambers, with curved sutures in the last whorl.

Types and occurrence.--Rock Creek section (132), Willapa River section (54).

LENTICULINA spp.

Discussion.--Fragments and/or poorly preserved specimens which can be identified only to genus.

Types and occurrence.--Clatskanie well (41), Clark and Wilson well (11), Cooper Mountain well (46), Wolf Creek section (8), Castor Creek section (39), Rock Creek section (48), Willapa River section (19).

LENTICULINA cf. L. TERRYI

(Coryell and Embich, 1937)

Discussion.--These specimens differ from the type in having fewer chambers and in being more biconvex due to a large amount of clear shell material in the umbonal region.

Types and occurrence.--Clatskanie well (62), Clark and Wilson well (16), Rock Creek section (137).

LENTICULINA TEXANA (Cushman and Applin, 1926)

Cristellaria articulata Reuss var. texana Cushman and Applin, 1926, p. 170, pl. 8, fig. 1a-b, 2.

Robulus texanus (Cushman and Applin).--Rau, 1948, p. 163, pl. 29, figs. 16, 17.--Rau, 1951, p. 432, pl. 64, fig. 18.--Drugg, 1958, p. 75, pl. 2, figs. 29-30.--Thoms, 1959, p. 66, pl. 2, fig. 8a-b.--Hamlin, 1962, p. 62.--Young, 1966, p. 105.--Strong, 1967, p. 56, pl. 1, figs. 3-4.

Lenticulina texanus (Cushman and Applin).--McDougall, 1972, p. 98.

Lenticulina articulatus (Reuss) texanus (Cushman and Applin).--McDougall, 1972, p. 95.

Discussion.--Only specimens with rounded sutures in the umbilical region, and nearly parallel sides in peripheral view were assigned to this species.

Types and occurrence.--Wolf Creek section (80), Castor Creek section (23), Rock Creek section (23), Willapa River section (127).

LENTICULINA WEAVERI (Beck, 1943)

Robulus weaveri Beck, 1943, p. 595, pl. 103, figs. 3, 8.

Types and occurrence.--Wolf Creek section (64).

LENTICULINA WELCHI (Church, 1931)

Robulus welchi Church, 1931, p. 212, pl. C, figs. 13-14.--Church, 1943, p. 182.--Smith, 1957, p. 159, pl. 21, figs. 4a-b, 5a-b, 6a-b.--Hornaday, 1961, p. 183, pl. 3, figs. 3a-b.--Weaver and Weaver, 1962, p. 24, pl. 5, fig. 5a-b.--Weaver and Molander, 1964, p. 182, pl. 5, figs. 3a-b, 4a-b.

Lenticulina welchi (Church).--McDougall, 1980, pl. 8, figs. 1-4.

Robulus aff. R. welchi Church.--Smith, 1956, p. 89, pl. 10, fig. 6a-b.

Robulus chiranus Cushman and Stone, 1947, p. 5, pl. 1, fig. 15.--Hornaday, 1961, p. 182, pl. 3, figs. 1a-b, 2a-b, 4a-b.--Sullivan, 1962, p. 257, pl. 7, figs. 1, 2a-b.--Kleinpell and Weaver, 1963, p. 169, pl. 4, fig. 6.--Weaver and Molander, 1964, p. 181, pl. 4, fig. 1ab.--DeLise, 1967, p. 27, pl. 1, fig. 10a-b.

Lenticulina chirana (Cushman and Stone).--Smith, 1971, p. 41, pl. 3, figs. 4a-b.--Tipton and others, 1973, p. 44, pl. 2, fig. 2a-b.

Discussion.--This species has been differentiated from Robulus chiranus Cushman and Stone because of more closed umbo and different apertural characters (Cushman and Stone, 1947). These characters are not consistent or distinct

guishable with any accuracy. Therefore R. chiranus is a junior synonym of Lenticulina welchi.

Types and occurrence.--USNM 262256, 262257, Clark and Wilson well (62), Wolf Creek section (43), Castor Creek section (9), Rock Creek section (49), Willapa River section (20).

LENTICULINA aff. L. WELCHI (Church, 1931)

Discussion.--These specimens resemble Lenticulina welchi (Church). They differ, however, in that the specimens are very close coiled; no inflation of the chambers; and the umbonal region and sutures are only slightly depressed. These forms are found in assemblages interpreted as representing the middle and outer neritic and in which no typical L. welchi is found.

Types and occurrence.--Clatskanie well (11), Clark and Wilson well (39).

LENTICULINA cf. L. WELCHI (Church, 1931)

Discussion.--Fragments of specimens which appear to belong to this species.

Types and occurrence.--Rock Creek section (50).

Genus MARGINULINA d'Orbigny, 1826

MARGINULINA ADUNCA (Costa, 1856)

Glandulina adunca Costa, 1856, p. 128, pl. 11, fig. 24a A.C.

Marginulina adunca (Costa).--Weaver and Molander, 1964, p. 183, pl. 6, fig. 4.--Fairchild and others, 1969, p. 44, pl. 8, fig. 1.--Smith, 1971, p. 44, pl. 4, fig. 6.--McDougall, 1980, pl. 8, figs. 5, 12.

Marginulina cf. M. adunca (Costa).--Sullivan, 1962, p. 261, pl. 8, figs. 7a-c, 8a-b.

Discussion.--The initial chambers are small and close coiled. The final chamber is inflated and comprises about 1/2 of the test. Sutures are oblique.

Types and occurrence.--USNM 262258, Clatskanie well (66), Clark and Wilson well (60), Cooper Mountain well (30), Wolf Creek section (44), Rock Creek section (24), Willapa River section (55).

MARGINULINA ALAZAENSIS Nuttall, 1932

Marginulina alazaensis Nuttall, 1932, p. 13, pl. 3, figs. 3, 7.--Rau, 1948, p. 164, pl. 29, fig. 4.--Mallory, 1959, p. 149.--Sullivan, 1962, p. 261, pl. 8, figs. 7a-b, 8a-b.--Fairchild and others, 1969, p. 44, pl. 8, fig. 17.--Smith, 1971, p. 44, pl. 4, fig. 7.--McDougall, 1980, pl. 8, figs. 6, 7.

Discussion.--Specimens assigned to this species are nearly straight sided and sutures are perpendicular to the sides above the initial coil. The figured specimen of Dentalina communis d'Orbigny, Cushman and Schenck (1928, p. 307, pl. 42, fig. 8) very closely resembles Marginulina alazaensis Nuttall.

Types and occurrence.--USNM 262259, Clatskanie well (72), Clark and Wilson well (90), Cooper Mountain well (31), Wolf Creek section (32), Castor Creek section (41), Rock Creek section (51).

MARGINULINA EXIMIA Neugeboren, 1851

Marginulina eximia Neugeboren, 1851, p. 129.--Sullivan, 1962, p. 262, pl. 8, fig. 9a-b.--Weaver and Molander, 1964, p. 183, pl. 6, fig. 5.--Fairchild and others, 1969, p. 44, pl. 8, fig. 4.--Smith, 1971, p. 45, pl. 4, fig. 8.--Tipton and others, 1973, p. 46, pl. 3, fig. 1a-b.--McDougall, 1980, pl. 8, figs. 8, 9.

Discussion.--This species of Marginulina is distinguished by the lateral compression of the test and the angled sutures. The test is straight to slightly curved in the uniserial stage.

Types and occurrence.--USNM 262260, Clatskanie well (26), Clark and Wilson well (40), Cooper Mountain well (17), Rock Creek section (144), Willapa River section (69).

MARGINULINA GLABRA d'Orbigny, 1826

Marginulina glabra d'Orbigny, 1826, p. 259, modeles, no. 55.--Parker, Jones, and Brady, 1865, pl. 1, fig. 36; after d'Orbigny's Modele.--Fairchild and others, 1969, p. 45, pl. 8, fig. 5.--Tipton and others, 1973, p. 47, pl. 3, fig. 2a-b.

Discussion--The specimens assigned to this species are short and squat, however, specimens from other areas tend to be more elongate but the test is still inflated.

Types and occurrence--Rock Creek section (140).

MARGINULINA INCONSPICUA Hussey, 1949

Marginulina inconspicua Hussey, 1949, p. 123, pl. 26, fig. 10.

Discussion--The initial end is acute and small whereas the last chamber is very large covering about 3/4 of the test.

Types and occurrence--Wolf Creek section (76).

MARGINULINA sp.

Marginulina sp. Fairchild, Wesendunk, and Weaver, 1969, p. 45, pl. 8, fig. 7.-
-McDougall, 1980, pl. 8, figs. 10, 11.

Discussion--These specimens have no keel; the last chamber is inflated; and the cross section is circular.

Types and occurrence--USNM 262261, Wolf Creek section (81), Rock Creek section (138).

MARGINULINA spp.

Discussion--Fragments or poorly preserved specimens which are identifiable to genus only.

Types and occurrence--Clatskanie well (63), Clark and Wilson well (65), Wolf Creek section (45), Willapa River (141).

MARGINULINA SUBBULLATA Hantken, Mallory, 1959

Marginulina subbullata Hantken.--Mallory, 1959, p. 151, pl. 9, figs. 13a, b, 14a, b, 15a, b.

Discussion.--Although Mallory assigns his specimens to this species, the figures differ from the type in that the specimens are shorter, the sutures are less depressed and the initial coil is very small and indistinct, the final chamber is much larger and more inflated than indicated by Hantken.

Types and occurrence.--Clatskanie well (#78), Wolf Creek section (25), Rock Creek section (160), Willapa River section (121).

MARGINULINA SUBRECTA Franke, 1927

Marginulina subrecta Franke, 1927, p. 19, pl. 1, fig. 28.--Cushman, 1935, p. 18, pl. 7, fig. 3a, b.--Smith, 1956, p. 89, pl. 11, figs. 4, 5a-b.--McDougall, 1980, pl. 8, figs. 13, 14.

Discussion.--Specimens assigned to this species are large with lengths over 1 mm and widths greater than 0.5 mm. The initial coil is small and indistinct. Chambers in the uniserial stage are large and inflated. Sutures are depressed only in the final chambers. Specimens are also similar to Marginulina yagواتensis Bermudez, 1949, from the Dominican Republic but are larger and have a rounded rather than acute periphery.

Types and occurrence.--USNM 262262, Rock Creek section (25).

Genus ORTHOMORPHINA Stainforth, 1952

ORTHOMORPHINA ROHRI (Cushman and Stainforth, 1945)

Nodogenerina rohri Cushman and Stainforth, 1945, p. 39, pl. 5, fig. 26.

Orthomorphina rohri (Cushman and Stainforth).--Smith, 1971, p. 45, pl. 6, fig. 4.--McDougall, 1980, pl. 8, figs. 15-18.

Discussion.--This species was transferred to this genus because of the round aperture with no tooth. Specimens are common to abundant in the assemblages believed to represent bathyal water depths.

Types and occurrence.--USNM 262263, 262264, Rock Creek section (74), Willapa River section (30).

Genus PLANULARIA DeFrance, 1826

PLANULARIA CREPEDULA (Fichtel and Moll, 1798)

Nautilus crepedula Fichtel and Moll, 1798, p. 64, pl. 19, figs. g-i.

Planularia crepedula (Fichtel and Moll).--Hornaday, 1965, p. 35, pl. 3, fig. 7.--McDougall, 1980, pl. 9, figs. 1, 2.

Lenticulina cf. L. crepidula Church.--Weaver and Weaver, 1962, p. 24, pl. 6, fig. 3.

Discussion.--The test is large, compressed laterally, and the periphery is smooth and acute on one edge. Sutures are flush with the test surface and angled.

Types and occurrence.--USNM 262265, Rock Creek section (142).

PLANULARIA MARKLEYANA Church, 1941

Planularia markleyana Church, 1931, p. 208, pl. A, fig. 6, pl. B, figs. 1, 10.--Church, 1941, p. 182.--Rau, 1948, p. 164, pl. 29, fig. 13.--Weaver and Weaver, 1962, p. 25, pl. 6, fig. 4a-b.--McDougall, 1980, pl. 9, figs. 3, 4.

Discussion.--This species has the most inflation of the species of Planularia considered in this study. The central knob on the coiled stage and the depressed sutures serve to distinguish this species from the others.

Types and occurrence.--USNM 262266, Castor Creek section (26), Rock Creek section (75).

PLANULARIA TOLMANI Cushman and Simonson, 1944

Planularia tolmani Cushman and Simonson, 1944, p. 195, pl. 30, figs. 13, 14.--
Weaver and Molander, 1964, p. 183, pl. 6, fig. 3a-b.--DeLise, 1967, p.
29, pl. 2, fig. 2.--McDougall, 1980, pl. 9, figs. 5, 6.

Discussion.--This species is distinguished from the other species by having a compressed test, a subacute periphery and sutures which are not depressed.

Types and occurrence.--USNM 262267, 262406, Rock Creek section (76), Willapa River section (21).

Genus PSEUDONODOSARIA Boomgaard, 1949

PSEUDONODOSARIA CONICA (Neugeboren, 1850)

Glandulina conica Neugeboren, 1850, p. 51, pl. 1, fig. 5a- b.

Pseudoglandulina conica (Neugeboren).--Smith, 1957, p. 168, pl. 23, figs. 1a-
b, 2.--Weaver and Weaver, 1962, p. 28, pl. 8, figs. 1, 2.--Weaver and
Molander, 1964, p. 185, pl. 6, fig. 18, pl. 7, fig. 1.--McDougall, 1980,
pl. 9, figs. 7, 8.

Nodosaria nallpeensis (Reuss).--McDougall, 1972, p. 81.

Pseudoglandulina nallpeensis Rau, 1951, p. 435, pl. 64, fig. 8.--Strain, 1964,
p. 71, pl. 2, fig. 16.

Discussion.--Pseudoglandulina nallpeensis Rau is here considered a junior synonym of the Pseudonodosaria conica (Neugeboren). Specimens from the Clatskanie well are most characteristic whereas specimens from the other sections are either poorly preserved or deformed. The deformities include obesity or constricted sutures.

Types and occurrence.--USNM 262268, Clatskanie well (33), Clark and Wilson well (91), Cooper Mountain well (22), Wolf Creek section (34), Rock Creek section (34), Willapa River section (131).

PSEUDONODOSARIA cf. P. CONICA (Neugeboren, 1850)

Discussion.--This differs from the type because there are fewer chambers and the test is not showing the same degree of elongation.

Types and occurrence.--Rock Creek section (128), Willapa River section (145).

PSEUDONODOSARIA CYLINDRACEA (Reuss, 1845)

Nodosaria (Glandulina) cylindracea Reuss, 1845, p. 25, pl. 13, figs. 1, 2.

Pseudoglandulina cylindracea (Reuss).--Cushman and Jarvis, 1932, p. 36, pl. 11, figs. 7, 8.--Cushman, 1946, p. 76, pl. 27, figs. 33, 34.--Mallory, 1959, p. 173, pl. 13, fig. 28.--McDougall, 1980, pl. 9, fig. 11.

Discussion.--Test cylindrical, rounded at both ends with indistinct chambers.

Types and occurrence.--USNM 262270, Clatskanie well (59), Clark and Wilson well (43), Rock Creek section (55).

PSEUDONODOSARIA INFLATA (Costa, 1853)

Glandulina inflata Costa, 1853, p. 14, pl. 4, fig. 1.

Glandulina inflata Bornemann, 1855, p. 320, pl. 12, figs. 6, 7.

Glandulina inflata Costa, 1856, p. 126, pl. 11, fig. 21a, A.

Nodosaria inflata (Bornemann).--McDougall, 1972, p. 80.

Pseudoglandulina inflata (Bornemann).--Cushman and Frizzell, 1943, p. 84, pl. 14, fig. 14.--Rau, 1948, p. 168, pl. 30, fig. 3.--Rau, 1951, p. 43, pl. 64, fig. 3.--Mumby, 1959, p. 71.--Strain, 1964, p. 71, pl. 2, fig. 15.--McWilliams, 1965, p. 92, pl. 3, fig. 8.--Young, 1966, p. 107, pl. 10, fig. 3.--McDougall, 1980, pl. 9, figs. 9, 10.

Nodosaria laevigata d'Orbigny n. var. Dumble, 1924, p. 443.

Nodosaria (Glandulina) laevigata d'Orbigny ovata Cushman and Applin, 1926, p. 169, pl. 7, figs. 12-13.

Nodosaria ovata (Cushman and Applin).--McDougall, 1972, p. 81.

Pseudoglandulina ovata (Cushman and Applin).--Kleinpell and Weaver, 1963, p. 771, pl. 7, fig. 7a-b.--Weaver and Molander, 1964, p. 185, pl. 7, fig. 2.--McWilliams, 1965, p. 93.

Discussion.--Pseudonodosaria inflata (Costa) and P. ovata (Cushman and Applin) are considered conspecific because characteristics cannot be identified which would differentiate these two species.

Types and occurrence.--USNM 262269, Eugene section (10), Clark and Wilson well (63), Cooper Mountain well (50), Wolf Creek section (10), Rock Creek section (35), Willapa River section (73).

?PSEUDONODOSARIA INFLATA (Costa, 1853)

Discussion.--Forms included here are not spherical but an elongated oval shape in side view and the greatest width is near the base.

Types and occurrence.--Clatskanie well (47).

PSEUDONODOSARIA sp.

Discussion.--These specimens are one- to two-chambered forms with acute to subacute initial ends. These are probably the juvenile forms of the other species of Pseudonodosaria identified in this study but there are no characters at this stage from which to determine the species.

Types and occurrence.--Clatskanie well (27), Clark and Wilson well (17), Rock Creek section (157), Willapa River section (103).

Genus SARACENARIA Defrance, 1824

SARACENARIA HANTKENI Cushman, 1933

Saracenaria arcuata (d'Orbigny) hantkeni Cushman, 1933, p. 4, pl. 1, figs. 11-12.--McDougall, 1972, p. 100.

Saracenaria hantkeni Cushman.--Rau, 1951, p. 435, pl. 64, fig. 6.--Sullivan, 1962, p. 262, pl. 8, figs. 13a-b, 14.--Kleinpell and Weaver, 1963, p. 171, pl. 7, fig. 8a-b.--Tipton and others, 1973, p. 49, pl. 3, fig. 11a-

b.--McDougall, 1980, pl. 9, figs. 12-17.

Discussion.--This species is distinguished by the round triangular test shape in cross section, the large size of the test and the subacute to acute peripheral edge. Specimens in the study area usually have numerous holes indicating the presence of predators in the area.

Types and occurrence.--USNM 262271, 262272, 262427, Clatskanie well (20), Wolf Creek section (77), Rock Creek section (39).

SARACENARIA SCHENCKI Cushman and Hobson, 1935

Saracenaria schencki Cushman and Hobson, 1935, p. 57, pl. 8, fig. 11.--Rau, 1948, p. 168, pl. 30, figs. 1, 2.--Tipton and others, 1973, p. 49, pl. 3, fig. 13a-b.--McDougall, 1980, pl. 10, figs. 1-3.

Discussion.--This species is rare in the study area. The triangular transverse section and apertural face are distinctive. Specimens are usually poorly preserved.

Types and occurrence.--USNM 262273, Cooper Mountain well (34), Wolf Creek section (98), Willapa River section (160).

SARACENARIA sp.

Discussion.--This specimen is probably a juvenile of one of the preceding species. The test is small (length = 0.24 mm, width = 0.18 mm), globose and roughly triangular in cross section. The sutures are angled but not depressed. There are seven chambers in the test.

Types and occurrence.--Clatskanie well (61).

Genus VAGINULINA d'Orbigny, 1826

VAGINULINA MEXICANA Nuttall, 1932

Vaginulina elegans d'Orbigny var. mexicana Nuttall, 1932, p. 16, pl. 3, figs. 12, 16.

Vaginulina mexicana Nuttall.--McDougall, 1980, pl. 10, figs. 4, 5.

Discussion.--The test of these specimens is nearly straight sided, particularly in the uniserial stage. The early portion of the test curves slightly. Sutures are limbate, slightly depressed and oblique. The test is compressed. There is no flange on the sides of the test. Lengths range from 0.48 to 1.20 mm and widths from 0.26 to 0.44 mm.

Types and occurrence.--USNM 262274, Willapa River section (147).

Genus VAGINULINOPSIS Silvestri, 1904

VAGINULINOPSIS SAUNDERSI (Hanna and Hanna, 1924)

Cristellaria saundersi Hanna and Hanna, 1924, p. 61, pl. 13, figs. 5, 6.

Vaginulinopsis saundersi (Hanna and Hanna).--Rau, 1948, p. 164, pl. 30, figs. 19-20.--Rau, 1951, p. 434, pl. 64, fig. 1.--Smith, 1957, p. 162, pl. 22, figs. 1a-b, 2a-b.--Kleinpell and Weaver, 1963, p. 170, pl. 6, fig. 6.--Weaver and Molander, 1964, p. 184, pl. 6, fig. 9.--McDougall, 1980, pl. 10, figs. 8, 9.

Discussion.--The raised limbate sutures distinguish this species from others in this genus.

Types and occurrence.--USNM 262276, Clark and Wilson well (5), Castor Creek section (15), Willapa River section (11).

VAGINULINOPSIS SUBLITUUS (Nuttall, 1932)

Cristellaria sublituus Nuttall, 1932, p. 11, pl. 1, figs. 13-14.

Marginulina nuttalli Todd and Kniker, 1952, p. 14, pl. 2, figs. 30-31.

Vaginulinopsis sublituus (Nuttall).--McDougall, 1980, pl. 10, figs. 6, 7.

Discussion.--This species is compressed rather than circular in cross section and therefore should be placed in the genus Vaginulinopsis. In the genus Vaginulinopsis there is no homonymy of specific names, thus reasons given by Todd and Kniker (1952) to change the name are not valid and the original name is restored.

This species has a compressed, straight test. Sutures are curved but flush with the surface of the test.

Types and occurrence.--USNM 262275, Wolf Creek section (83).

Subfamily PLECTOFRONDICULARIINAE Cushman, 1927

Genus PLECTOFRONDICULARIA Liebus, 1902

PLECTOFRONDICULARIA GRACILIS Smith, 1956

Plectofrondicularia gracilis Smith, 1956, p. 93, pl. 12, figs. 2-5.--Carroll, 1959, p. 62-63, pl. 2, fig. 1.--Mumby, 1959, p. 82, pl. 4, fig. 23.--Kleinpell and Weaver, 1963, p. 174, pl. 8, figs. 8, 11.--Fairchild and others, 1969, p. 47, pl. 9, fig. 11.--McDougall, 1980, pl. 10, figs. 10-12.

Discussion.--The specific name used by Smith is a junior homonym because Rey (1955) used Plectofrondicularia gracilis to describe a species from Tunisia. To resolve this problem the type species described by Rey (1955) must be examined. P. gracilis Rey, 1955, may be the senior synonym of P. gracilis Smith, 1956.

Distinctive characteristics between this species and other species of Plectofrondicularia are slight and transitional forms exist. Only the end members can be easily identified. The name Plectofrondicularia gracilis Smith is, here, restricted to species of Plectofrondicularia with 3 to 6 costae which cover 1/4 of the test.

Types and occurrence.--USNM 262277, 262278, 262407, Clatskanie well (6), Clark and Wilson well (66), Wolf Creek section (66), Castor Creek section (12), Rock Creek section (30), Willapa River section (102).

PLECTOFRONDICULARIA MINUTA Sullivan, 1959

Plectofrondicularia minuta Sullivan, in Mallory, 1959, p. 213, pl. 18, figs. 3-4.--McDougall, 1980, pl. 10, fig. 13.

Plectofrondicularia minuta Sullivan, 1962, p. 269, pl. 13, figs. 1-4.--
Fairchild and others, 1969, p. 47, pl. 9, fig. 2a-b, 3.

Discussion.--The spinose periphery and small size distinguish this species of Plectofrondicularia from the others.

Types and occurrence.--USNM 262279, Rock Creek section (88).

PLECTOFRONDICULARIA OREGONENSIS Cushman, Stewart, and Stewart, 1947

Plectofrondicularia oregonensis Cushman, Stewart, and Stewart, 1947, p. 77,
pl. 10, fig. 4, p. 100, pl. 13, fig. 7.--Strain, 1964, p. 75, pl. 3, fig.
7.--McDougall, 1972, p. 101.--McDougall, 1980, pl. 10, figs. 14, 15.

Discussion.--This species closely resembles the P. gracilis group, but can be differentiated by the small, narrow, not flaring test and the strong arched chambers.

Types and occurrence.--USNM 262280, Clark and Wilson well (87), Rock Creek section (152), Willapa River section (125).

PLECTOFRONDICULARIA cf. P. OREGONENSIS

Cushman, Stewart, and Stewart, 1947

Discussion.--Preservation of this species is too poor to precisely assign it to species.

Types and occurrence.--Castor Creek section (34).

PLECTOFRONDICULARIA PACKARDI

Cushman and Schenck, 1928

Plectofrondicularia packardi Cushman and Schenck, 1928, p. 311, pl. 43, figs. 14, 15.--Rau, 1951, p. 438, pl. 65, fig. 12.--Wilson, 1954, p. 138, pl. 15, fig. 9.--Hornaday, 1961, p. 187, pl. 4, fig. 20.--McDougall, 1980, pl. 10, fig. 16, pl. 11, figs. 1, 2.

Plectofrondicularia packardi packardi Cushman and Schenck.--Smith, 1956, p. 94, pl. 12, figs. 1, 7.--Drugg, 1958, p. 89, pl. 4, fig. 18.--Bagley, 1959, p. 79.--Carroll, 1959, p. 63, pl. 2, fig. 2.--Thoms, 1959, p. 75, pl. 3, fig. 16.--Sullivan, 1962, p. 270, pl. 12, figs. 11, 12.--Kleinpell

and Weaver, 1963, p. 174, pl. 8, figs. 5-7, 10, 14.--Strain, 1964, p. 75, pl. 3, fig. 8.--Fairchild and others, 1969, p. 48, pl. 9, fig. 20.--McDougall, 1972, p. 102, pl. 3, fig. 12.--Tipton and others, 1973, p. 50, pl. 4, fig. 8.

Discussion.--The origin of Plectofrondicularia packardi packardi Cushman and Schenck is unclear. The earliest appearance of this name is in Smith (1956, p. 94, pl. 12, figs. 1, 7) but no reason is given for abandoning Plectofrondicularia packardi Cushman and Schenck. The subspecies was not described. For this study, specimens usually referred to P. packardi packardi Cushman and Schenck are P. packardi Cushman and Schenck.

Specimens assigned to this species have a broad flaring test with several, usually less than four, costae covering only the initial portion of the test. There are two types of initial ends, representing the megalospheric and microspheric forms of this species. One is blunt, rounded, and with three to four short costae. The other form is smaller, more pointed, and with two costae.

Types and occurrence.--USNM 262281, 262282, 262409, 262410, 262421, Clatskanie well (8), Clark and Wilson well (9), Cooper Mountain well (56), Wolf Creek section (19), Castor Creek section (27), Rock Creek section (31), Willapa River section (31).

PLECTOFRONDICULARIA PACKARDI MULTILINEATA

Cushman and Simonson, 1944

Plectofrondicularia packardi multilineata Cushman and Simonson, 1944, p. 197, pl. 32, figs. 2-4.--Rau, 1948, p. 171, pl. 30, fig. 19.--Rau, 1951, p. 439, pl. 65, fig. 1, 2.--Loney, 1951, p. 77.--Smith, 1956, p. 94, pl. 12, fig. 6.--Carroll, 1959, p. 63, pl. 2, fig. 2.--Mumby, 1959, p. 82, pl. 4, fig. 24.--Hornaday, 1961, p. 187, pl. 4, fig. 21.--Hamlin, 1962, p. 73.--Sullivan, 1962, p. 270, pl. 12, fig. 10.--Weaver and Weaver, 1962, p. 30, pl. 8, fig. 11.--Strain, 1964, p. 76, pl. 3, fig. 9.--Fairchild and others, 1969, p. 48, pl. 9, fig. 16.--Smith, 1971, p. 48, pl. 6, fig. 1.--McDougall, 1972, p. 101, pl. 3, fig. 13.--Tipton and others, 1973, p. 51, pl. 4, fig. 9.--McDougall, 1980, pl. 11, fig. 3.

Discussion.--Smith (1956) found a sequence grading from Plectofrondicularia packardi s.s. Cushman and Schenck to P. packardi multilineata Cushman and Simonson to P. gracilis Smith. This is also true for the specimens in this study. Plectofrondicularia packardi multilineata can be distinguished by the numerous heavy costae covering the entire test.

Types and occurrence.--USNM 262283, Wolf Creek section (108), Rock Creek section (134), Willapa River section (92).

PLECTOFRONDICULARIA SEARSI

Cushman, Stewart, and Stewart, 1947

Plectofrondicularia searsi Cushman, Stewart, and Stewart, 1947, p. 78, pl. 10, fig. 5, pl. 11, fig. 8.--Sullivan, 1962, p. 270, pl. 13, fig. 9.--Smith, 1969, p. 48, pl. 6, fig. 2.--McDougall, 1972, p. 102, pl. 3, fig. 14.--McDougall, 1980, pl. 11, fig. 4.

Discussion.--This species has a narrow test with very fine costae, nearly striations, which cover the entire test.

Types and occurrence.--USNM 262284, 262408, Rock Creek section (145).

PLECTOFRONDICULARIA spp.

Discussion.--The majority of these are fragments, usually the upper portion, which cannot be identified to species.

Types and occurrence.--Clatskanie well (18), Clark and Wilson well (80), Cooper Mountain well (49), Wolf Creek section (20), Rock Creek section (32), Willapa River section (74).

PLECTOFRONDICULARIA VAUGHANI Cushman, 1927

Plectofrondicularia vaughani Cushman, 1927, p. 112, pl. 23, fig. 3.--Rau, 1951, p. 439, pl. 65, fig. 11.--Smith, 1956, p. 94, pl. 11, fig. 14.--Sullivan, 1962, p. 271, pl. 12, fig. 7.--Weaver and Molander, 1964, p. 188, pl. 8, fig. 6.--Fairchild and others, 1969, p. 48, pl. 9, fig. 10.--Smith, 1971, p. 48, pl. 6, fig. 3.--McDougall, 1972, p. 103.--Tipton and others, 1973, p. 51, pl. 4, fig. 11.--McDougall, 1980, pl. 11, fig. 5.

Discussion.--This species is easily recognized by the broad, flaring test, and the very distinctive coil of chambers around the proloculus.

Types and occurrence.--USNM 262285, Clark and Wilson well (81), Rock Creek section (54), Willapa River section (144).

PLECTOFRONDICULARIA cf. P. VAUGHANI

Cushman, 1927

Plectofrondicularia cf. P. vaughani Cushman.--McDougall, 1980, pl. 11, fig. 6.

Discussion.--These specimens do not have a broadly flaring test, instead the sides are nearly parallel. The proloculus is very distinct.

Types and occurrence.--USNM 262286, Rock Creek section (139).

PLECTOFRONDICULARIA VOKESI Cushman,

Stewart, and Stewart, 1949

Plectofrondicularia vokesi Cushman, Stewart, and Stewart, 1949, p. 132, pl. 15, fig. 4.--Sullivan, 1962, p. 271, pl. 13, fig. 10.--Kleinpell and Weaver, 1963, p. 174, pl. 9, fig. 2.--Weaver and Molander, 1964, p. 188, pl. 8, fig. 7.--Fairchild and others, 1969, p. 49, pl. 9, fig. 7.--McDougall, 1980, pl. 11, fig. 7.

Plectofrondicularia garzaensis Cushman and Siegfus.--DeLise, 1967, p. 32, pl. 2, fig. 13.

Discussion.--This species is distinguished by the narrow test and acute periphery or keel. The illustrated specimen has a lobate almost spinose periphery because of dissolution.

Types and occurrence.--USNM 262287, Clark and Wilson well (88), Castor Creek section (28), Rock Creek section (77), Willapa River section (159).

Genus AMPHIMORPHINA Neugeboren, 1850

AMPHIMORPHINA BECKI Mallory, 1959

Amphimorphina becki Mallory, 1959, p. 215, pl. 19, fig. 1a-b.--McDougall, 1980, pl. 11, fig. 8.

Discussion.--The quadrangular shape and costae on the initial chambers distinguish this species.

Types and occurrence.--USNM 262288, Cooper Mountain well (1).

AMPHIMORPHINA JENKINSI (Church, 1941)

Plectofrondicularia jenkinsi Church, 1931, p. 208, pl. A, fig. 5.--Church, 1941, p. 182.

Amphimorphina jenkinsi (Church).--Mallory, 1959, p. 216, pl. 18, fig. 5.--Weaver and Weaver, 1962, p. 31, pl. 9, fig. 2.--Kleinpell and Weaver, 1963, p. 174, pl. 9, fig. 3.--McDougall, 1980, pl. 11, fig. 9.

Discussion.--Although specimens in the study area are usually broken, they can be recognized by the acute smooth periphery and the curved chambers.

Types and occurrence.--USNM 262289, Willapa River section (57).

Family POLYMORPHINIDAE d'Orbigny, 1839

Subfamily POLYMORPHININAE d'Orbigny, 1839

Genus POLYMORPHINA d'Orbigny, 1826

POLYMORPHINA sp.

Discussion.--These specimens are small, lack distinctive characters and are probably juveniles. The oval-shaped test has the slight twist typical of polymorphinids. The chambers appear to be arranged biserially, however, there are only three chambers. The aperture is radiate and terminal.

Types and occurrence.--Clark and Wilson well (82), Wolf Creek section (112), Rock Creek section (165), Willapa River section (115).

Genus GLOBULINA d'Orbigny, 1839

GLOBULINA GIBBA d'Orbigny, 1826

Polymorphina (Globulina) gibba d'Orbigny, 1826, p. 266, Modeles, no. 63, 3me livraison.

Globulina gibba d'Orbigny.--Kleinpell and Weaver, 1963, p. 172, pl. 7, fig. 13.--McDougall, 1972, p. 104.--McDougall, 1980, pl. 11, figs. 10, 11.

Discussion.--The test is large and shaped like a lumpy sphere. Only two to three chambers can be seen because of the overlap. The aperture is terminal and radiate.

Types and occurrence.--USNM 262290, Clark and Wilson well (52), Rock Creek section (141), Willapa River section (110).

GLOBULINA sp.

Discussion.--Specimens are large, globular with 2 1/4 chambers per whorl and a radiate aperture.

Types and occurrence.--Clatskanie well (57), Clark and Wilson well (61), Cooper Mountain well (55), Wolf Creek section (42), Rock Creek section (167), Willapa River section (132).

Superfamily NODOSARIACEA Ehrenberg, 1838

Family POLYMORPHINIDAE d'Orbigny, 1839

Genus GUTTULINA d'Orbigny in de la Sagra, 1839

GUTTULINA FRANKEI Cushman and Ozawa

Guttulina frankei Cushman and Ozawa, 1930, p. 28, pl. 4, figs. 1a-c.--Rau, 1948, p. 170, pl. 30, figs. 17, 18.--Rau, 1951, p. 435-436, pl. 64, figs. 14, 15.--McDougall, 1980, pl. 11, figs. 12-14.

Discussion.--The nearly diamond-shaped test is the most distinctive feature of this species. The aperture and initial end form to points of the diamond. The other angles are rounded. The cross section is oval and trian-

gular.

Types and occurrence.--USNM 262291, Wolf Creek section (22), Rock Creek section (124), Willapa River section (111).

GUTTULINA HANTKENI Cushman and Ozawa

Guttulina hantkeni Cushman and Ozawa, 1930, p. 33, pl. 5, figs. 4-6.--Rau, 1948, p. 169, pl. 30, figs. 11, 12.--McDougall, 1980, pl. 11, figs. 1-3.

Discussion.--The botryoidal shape of the test with an acute aperture and blunt initial end distinguish this species from others.

Types and occurrence.--Clark and Wilson well (18), Cooper Mountain well (60), Wolf Creek section (37), Rock Creek section (116), Willapa River (80).

GUTTULINA cf. G. HANTKENI Cushman and Ozawa

Guttulina cf. G. hantkeni Cushman and Ozawa.--McDougall, 1980, pl. 12, figs. 4-6.

Discussion.--Specimens assigned to this species differ from G. hantkeni in being less globose and overlapping chambers extend closer to the base, therefore the broadest portion of the test is near the base. The upper half of the test is very slender. This differs from G. problema in being less globose, and in having chambers which are successively further removed from the base. These specimens resemble the early stages of G. austriaca d'Orbigny (Cushman and Ozawa, 1930, p. 29, pl. 4, figs. 3, 4) except they are not as botryoidal and the upper portion is quite slender.

Types and occurrence.--USNM 262293, Wolf Creek section (101), Rock Creek section (130).

GUTTULINA IRREGULARIS (d'Orbigny)

Globulina irregularis d'Orbigny, 1846, p. 226, pl. 13, figs. 9, 10.

Guttulina irregularis (d'Orbigny).--Cushman and Ozawa, 1930, p. 25-27, pl. 3, figs. 4, 5, pl. 7, figs. 1, 2.--Beck, 1943, p. 602, pl. 106, figs. 3, 15.--Cushman and Simonson, 1944, p. 196, pl. 31, figs. 10-12.--Rau, 1948, p. 169, pl. 30, figs. 7, 8.--Rau, 1951, p. 435, pl. 64, figs. 16, 17.--Wilson, 1954, p. 137, pl. 15, fig. 4a-b.--Sullivan, 1962, p. 267, pl. 11, fig. 8a-c.--Tipton and others, 1973, p. 49.--McDougall, 1980, pl. 12, figs. 7-11.

Guttulina byramensis (Cushman).--Cushman and Schenck, 1928, p. 309, pl. 43, figs. 6-8.

Polymorphina byramensis Cushman, 1922, p. 94.--Cushman, 1923, p. 31, pl. 5, figs. 1-5.

Guttulina problema d'Orbigny (not d'Orbigny, 1826), 1846, p. 224, pl. 12, figs. 26-28.--Cushman and Schenck, 1928, (in part), p. 310, pl. 43, fig. 9.--Beck, 1943, p. 602, pl. 106, figs. 11, 17, 20.--Kleinpell and Weaver, 1963, p. 172, pl. 7, fig. 15.

Guttulina sp.--Wilson, 1954, p. 137, pl. 15, fig. 5a-b.

Discussion.--Five variations of Guttulina irregularis are included within this species grouping. Most common is the normal G. irregularis (McDougall, 1980, pl. 12, figs. 7, 8) which fits the type description of Cushman and Ozawa (1930).

Variation 1 differs only in having very rounded form instead of being triangular. These may grade into G. problema.

Variation 2 differs from the norm by becoming elongate and more slender. The shape more closely resembles that of an isosceles triangle instead of an equilateral triangle.

Variations 3, 4, and 5 are all related and probably represent different growth stages. This is also suggested by the first appearance of these variations. Variation 3 (McDougall, 1980, pl. 12, figs. 9-11) is similar although larger and with a less elongated upper portion than the slender G. irregularis (variation 2). If two chambers are added to this form in a quinqueline series and with very depressed sutures, variation 4 will result. In this form (variation 4) the last chambers do not reach the base. If several more chambers are added in a quinqueloculine series and with the base

of each chamber being progressively further removed from the base of the test the fifth variation is produced. This last group of variations or growth stages probably constitutes a new species. The similarity of the early growth stages to G. irregularis would make separation of the species questionable unless the last stage was present and definite relation to early forms could be established.

Types and occurrence.--USNM 262294, 262295, 262296, 262297, 262298, 262299, 262411, Eugene section (7), Clark and Wilson well (75), Cooper Mountain well (48), Wolf Creek section (13), Castor Creek section (6), Rock Creek section (117), Willapa River section (95).

GUTTULINA cf. G. ORIENTALIS Cushman and Ozawa

Discussion.--This specimen is close to G. orientalis Cushman and Ozawa (1930, p. 24, pl. 3, figs. 2, 3). The test is ovate to fusiform in outline, broadest near base; sutures are not depressed; and chambers are arranged in a counterclockwise quinqueloculine series. G. orientalis has chambers added in a clockwise series.

Types and occurrence.--USNM 262300, Clark and Wilson well (76), Wolf Creek section (104), Rock Creek section (131).

GUTTULINA PROBLEMA d'Orbigny

Guttulina problema d'Orbigny, 1826, p. 266, no. 14.--Cushman and Schenck, 1928 (in part), p. 310, pl. 43, figs. 10-11.--Cushman and Ozawa, 1930, p. 19-22, pl. 2, figs. 1-6, pl. 3, figs. 1a-c.--Beck, 1943, p. 602, pl. 106, figs. 11, 17, 20.--Smith, 1956, p. 92, pl. 11, fig. 10a-b.--Sullivan, 1962, p. 267, pl. 11, figs. 9a-c.--Smith, 1971, p. 49, pl. 5, fig. 5.--McDougall, 1980, pl. 13, figs. 1-3.

Discussion.--The broad base with each succeeding chamber slightly removed and the width of the test compared to the length distinguish this species from other species.

Types and occurrence.--USNM 262301, Clatskanie well (25), Clark and Wilson well (85), Cooper Mountain well (61), Wolf Creek section (29), Castor Creek section (49), Rock Creek section (118), Willapa River section (113).

GUTTULINA spp.

Discussion.--This group includes fragments and poorly preserved specimens which can only be referred to genus.

Types and occurrence.--Wolf Creek section (38), Rock Creek section (107), Willapa River section (28).

Genus PYRULINA d'Orbigny, 1839

PYRULINA CYLINDROIDES (Roemer, 1838)

Polymorphina (Polymorphinen) cylindroides Roemer, 1838, p. 385, pl. 3, fig. 26a-b.

Discussion.--The specimen is elongate, very slender, and tear-drop shaped. Both the apertural and initial ends are acute. Chambers are biserially arranged but rotate counterclockwise around the long axis of the test. Chambers overlap and each succeeding one is removed slightly more from the base.

Types and occurrence.--Wolf Creek section (92).

PYRULINA FUSIFORMIS (Roemer, 1838)

Polymorphina (Globulinen) fusiformis Roemer, 1838, p. 386, pl. 3, fig. 37a-b.-
-McDougall, 1980, pl. 13, figs. 4, 5.

Discussion.--The test is smooth, fusiform in shape, with three chambers per whorl. Chambers are overlapping but each succeeding chamber is further removed from the base. The aperture is terminal and radiate.

Types and occurrence.--USNM 262302, Clark and Wilson well (50), Wolf Creek section (102), Rock Creek section (37), Willapa River section (99).

PYRULINA sp.

Discussion.--These specimens are much fatter than other species and partially replaced with pyrite.

Types and occurrence.--Wolf Creek section (113).

Genus SIGMOMORPHINA Cushman and Ozawa, 1928

SIGMOMORPHINA PSEUDOSCHENCKI Rau, 1951

Sigmomorphina pseudoschencki Rau, 1951, p. 436, pl. 64, fig. 11.

Sigmomorphina schencki Rau, 1948, p. 170, pl. 30, figs. 13, 14.

Discussion.--One specimen found in the study area is identical to Rau's illustration.

Types and occurrence.--Willapa River section (152).

SIGMOMORPHINA SCHENCKI Cushman and Ozawa, 1930

Sigmomorphina schencki Cushman and Ozawa, 1930, p. 133, pl. 35, figs. 6a, b.--
Rau, 1951, p. 436, pl. 64, figs. 19-21.--McDougall, 1980, pl. 13, figs. 8, 9.

Sigmoidella elegantissima (Parker and Jones).--Cushman and Schenck, 1928, p. 310, pl. 43, figs. 12, 13.

Discussion.--This species can be distinguished from Guttulina by the compressed test and sigmoid coiling.

Types and occurrence.--USNM 262304, 262412, Clark and Wilson well (67), Wolf Creek section (35), Rock Creek section (136), Willapa River section (122).

Family GLANDULINIDAE Reuss, 1860

Subfamily GLANDULININAE Reuss, 1860

Genus GLANDULINA d'Orbigny, 1839

GLANDULINA LAEVIGATA (d'Orbigny, 1826)

Nodosaria (Glandulina) laevigata d'Orbigny, 1826, p. 252.

Glandulina laevigata (d'Orbigny).--Cushman and Schenck, 1928, p. 309, pl. 43, fig. 4.--Loeblich and Tappan, 1953, p. 81, pl. 16, figs. 2-5.--McDougall, 1980, pl. 13, figs. 6, 7.

Discussion.--Specimens in this study are shorter (length 0.3-0.4) and the chambers more overlapping than the holotype. The biserial stage is present and most specimens have not become uniserial. The last chamber covers one-half to three-fourths of the test.

Types and occurrence.--USNM 262303, Wolf Creek section (41), Rock Creek section (155), Willapa River section (156).

Subfamily OOLININAE Loeblich and Tappan, 1961

Genus FISSURINA Reuss, 1850

FISSURINA sp.

Fissurina sp.--McDougall, 1980, pl. 13, figs. 10, 11.

Discussion.--Test small, oval in cross section and side view. The aperture is a slit with a flaplike structure protruding from the terminal end of the test. Ornamentation is not present.

Types and occurrence.--USNM 262305, Clark and Wilson well (73), Rock Creek section (129), Willapa River section (86).

Genus PARAFISSURINA Parr, 1947

PARAFISSURINA sp.

Parafissurina sp.--McDougall, 1980, pl. 13, figs. 12, 13.

Discussion.--This specimen is close to Lagena ventricosta Silvestri, with the hooded aperture but differs by having a spine and ridge around the base of the test.

Types and occurrence.--USNM 262306, Rock Creek section (133).

Superfamily BULIMINACEA Jones, 1875

Family TURRILINIDAE Cushman, 1927

Subfamily TURRILININAE Cushman, 1927

Genus BULIMINELLA Cushman, 1911

BULIMINELLA BASSENDORFENSIS

Cushman and Parker, 1937

Buliminella bassendorfensis Cushman and Parker, 1937, p. 40, pl. 4, fig. 13.

Discussion.--Specimens assigned to this species from the study area are smaller than the holotype. Maximum length is 0.4 mm. The coiling and arrangement of chambers (4 per whorl) identify these specimens to genus and the tighter coil, fewer whorls, and less inflated chambers identify the species.

Types and occurrence.--Cooper Mountain well (70).

Family BOLIVINITIDAE Cushman, 1927

Genus BOLIVINA d'Orbigny, 1839

BOLIVINA GARDNERAE Cushman, 1926

Bolivina gardnerae Cushman, 1926, p. 31, pl. 4, fig. 7.--McDougall, 1980, pl. 14, figs. 1, 2.

Discussion.--These specimens are extremely small, have rounded to blunt terminal end and a rounded periphery. The cross section is oval. Sutures are depressed and straight. Chambers gradually increase in size and are slightly inflated.

Types and occurrence.--USNM 262307, Clark and Wilson well (22), Castor Creek section (35), Rock Creek section (61), Willapa River section (24).

BOLIVINA HUNNERI Howe, 1939

Bolivina hunneri Howe, 1939, p. 66, pl. 9, figs. 3-4.--Weaver and Molander, 1964, p. 191, pl. 9, fig. 8.

Discussion.--These specimens are nearly straight sided, small and covered by numerous fine costae which obscure other features of the test.

Types and occurrence.--Willapa River section (25).

BOLIVINA JACKSONENSIS Cushman and Applin, 1926

Bolivina jacksonensis Cushman and Applin, 1926, p. 167, pl. 7, fig. 3, 4.--Hornaday, 1961, p. 190, pl. 6, fig. 8a-b.--Weaver and Molander, 1964, p. 191, pl. 9, fig. 9.

Discussion.--This species is recognized by the thickness of the median line, the acute to subacute periphery, and the numerous chambers.

Types and occurrence.--Rock Creek section (62).

BOLIVINA JACKSONENSIS STRIATELLA

Cushman and Applin, 1926

Bolivina jacksonensis striatella Cushman and Applin, 1926, p. 167, pl. 7, fig. 5, 6.--McDougall, 1980, pl. 14, figs. 5, 6.

Discussion.--This species can be distinguished by the fine striations which cover one-half to three-fourths of the test. Chambers are distinct with slightly depressed sutures.

Types and occurrence.--USNM 262309, Clark and Wilson well (23), Wolf Creek section (95), Rock Creek section (154).

BOLIVINA KLEINPELLI Beck, 1943

Bolivina kleinPELLI Beck, 1943, p. 606, pl. 107, fig. 39.--Drugg, 1958, p. 102-103, pl. 5, fig. 38.--Sullivan, 1962, p. 276, pl. 15, fig. 6a-b.--Weaver and Molander, 1964, p. 191, pl. 9, fig. 10.--McDougall, 1980, pl. 14, figs. 3, 4.

Brizalina kleinPELLI (Beck).--Fairchild and others, 1969, p. 52, pl. 10, fig. 7a-b.

Discussion.--Specimens assigned to this species are distinguished by the compressed test, subacute periphery, and curved and slightly raised sutures. Sutures are flush with the surface. These are the largest bolivinids found in the study area.

Types and occurrence.--USNM 262308, Eugene section (4), Clatskanie well (30), Clark and Wilson Well (24), Wolf Creek section (93), Rock Creek section (4), Willapa River section (49).

BOLIVINA MARGINATA Cushman, 1918

Bolivina marginata Cushman, 1918, p. 48, pl. 10, fig. 1.--Sullivan, 1962, p. 276, pl. 15, fig. 9a-b.--Fairchild and others, 1969, p. 52, pl. 10, figs. 15a-b, 18.

Discussion.--The keel differentiates this species from all others in the study area.

Types and occurrence.--Cooper Mountain well (75), Willapa River section (150).

BOLIVINA PISCIFORMIS Galloway and Morrey, 1929

Bolivina pisciformis Galloway and Morrey, 1929, p. 36, pl. 5, fig. 10.--McDougall, 1980, pl. 14, fig. 9.

Discussion.--Specimens of this species can be identified by the broad flat test and serrated test edge. Peripheral ends of chambers are usually pointed and may have spines associated. The initial end is more pointed than any other species.

Types and occurrence.--USNM 262311, Clark and Wilson well (25), Rock Creek section (63), Willapa River section (38).

BOLIVINA SCABRATA Cushman and Bermudez, 1936

Bolivina scabrata Cushman and Bermudez, 1936, p. 29, pl. 5, fig. 11-12.--
Weaver and Weaver, 1962, p. 33, pl. 10, fig. 7.--McDougall, 1980, pl. 14,
figs. 7, 8.

Discussion.--The last pair of chambers in this species are inflated. The initial portion of the test twists and has a rounded end.

Types and occurrence.--USNM 262310, Clark and Wilson well (96), Castor Creek section (16), Rock Creek section (64), Willapa River section (26).

BOLIVINA spp.

Discussion.--This groups includes fragments and poorly preserved specimens.

Types and occurrence.--Clark and Wilson well (71), Cooper Mountain well (25), Wolf Creek section (86), Castor Creek section (2), Rock Creek section (65), Willapa River section (39).

Family ISLANDIELLIDAE Loeblich and Tappan, 1964

Genus CASSIDULINOIDES Cushman, 1927

CASSIDULINOIDES sp.

Discussion.--The test is small with the uncoiled and coiled portions each comprising about one-half the test. The test is globose; chambers are inflated; and sutures are depressed in the latter part of the test. There are three chambers in the uncoiled portion. The loop-shaped aperture is at the base of the last chamber and last suture.

Types and occurrence.--Willapa River section (66).

Family EOUVIGERINIDAE Cushman, 1927

Genus STILOSTOMELLA Guppy, 1894

STILOSTOMELLA ADOLPHINA (d'Orbigny, 1846)

Dentalina adolphina d'Orbigny, 1846, p. 51.--Cushman and Schenck, 1928, p. 308, pl. 42, fig. 6.--Sullivan, 1962, p. 272, pl. 13, fig. 17a-b.--Weaver and Molander, 1964, p. 188, pl. 8, fig. 8.

Dentalina aff. D. adolphina d'Orbigny.--Drugg, 1958, p. 78, pl. 3, fig. 14.

Dentalina cf. D. adolphina d'Orbigny.--Mumby, 1959, p. 65.

Stilostomella adolphina (d'Orbigny).--McDougall, 1980, pl. 14, fig. 10.

Discussion.--This species is differentiated from the others in this species by short spines at the base of each chamber. The spines may be arranged in several rows.

Types and occurrence.--USNM 262312, Clatskanie well (35), Wolf Creek section (69), Rock Creek section (4U), Willapa River section (22).

STILOSTOMELLA ADVENA (Cushman and Laiming, 1931)

Nodogenerina advena Cushman and Laiming, 1931, p. 106, pl. 11, fig. 19.--Smith, 1956, p. 95, pl. 11, fig. 13a-b.--Drugg, 1958, p. 91, pl. 4, fig. 24.--Bagley, 1959, p. 79, pl. 4, fig. 16.--Sullivan, 1962, p. 272, pl. 13, figs. 20, 21.--Kleinpell and Weaver, 1963, p. 175, pl. 9, fig. 4.--Young, 1966, p. 112.--Carlson, 1969, p. 17.--Tipton and others, 1973, p. 51, pl. 4, fig. 12.

Nodogenerina cf. N. advena Cushman and Laiming.--Weaver and Molander, 1964, p. 188, pl. 8, fig. 9.

Stilostomella advena (Cushman and Laiming).--Fairchild and others, 1969, p. 53, pl. 10, fig. 8.--Smith, 1971, p. 52, pl. 6, fig. 5.--McDougall, 1980, pl. 14, fig. 11.

Discussion.--Specimens assigned to this species have a smooth test. Sutures are not greatly depressed.

Types and occurrence.--USNM 262313, Clatskanie well (68), Wolf Creek section (78), Rock Creek section (56), Willapa River section (64).

STILOSTOMELLA LEPIDULA (Schwager, 1866)

Nodosaria lepidula Schwager, 1866, p. 210, pl. 5, figs. 27-28.--Galloway and Morrey, 1931, p. 337, pl. 38, fig. 1.

Nodogenerina lepidula (Schwager).--Cushman, 1948, p. 531, pl. 26, fig. 36.--Mallory, 1959, p. 217, pl. 18, fig. 10.--Bagley, 1959, p. 79, pl. 4, fig. 17.--Weaver and Weaver, 1962, p. 29, pl. 8, fig. 9.--Weaver and Molander, 1964, p. 189, pl. 8, fig. 11.--McDougall, 1972, p. 112.

Stilostomella lepidula (Schwager).--McDougall, 1980, pl. 14, fig. 12.

Discussion.--A row of fine spines around the middle of each chamber distinguishes this species from the others.

Types and occurrence.--USNM 262314, Clatskanie well (48), Clark and Wilson well (34), Wolf Creek section (47), Rock Creek section (57), Willapa River section (126).

STILOSTOMELLA sp. A

Stilostomella sp.--McDougall, 1980, pl. 14, fig. 13.

Discussion.--Although the chambers are more closely appressed and the costae are not restricted to the base of the chambers, this could be the initial portion of a Stilostomella lepidula (Schwager) test.

Types and occurrence.--USNM 262315, Rock Creek section (108).

STILOSTOMELLA sp. B

Stilostomella sp.--McDougall, 1980, pl. 14, fig. 14.

Discussion.--This could be the initial part of a Stilostomella advena (Cushman and Laiming, 1931) test, although chambers are more closely appressed.

Types and occurrence.--USNM 262316, Rock Creek section (96).

STILOSTOMELLA spp.

Discussion.--Fragments and poorly preserved specimens not identifiable to species.

Types and occurrence.--Clark and Wilson well (83), Castor Creek section (30), Willapa River section (32).

Family BULIMINIDAE Jones, 1875

Subfamily BULIMININAE Jones, 1875

Genus BULIMINA d'Orbigny, 1826

BULIMINA ALSATICA Cushman and Parker, 1937

Bulimina alsatica Cushman and Parker, 1937, p. 39, pl. 4, fig. 6-7.--Cushman and Parker, 1946, p. 102, pl. 24, figs. 10, 11.--McDougall, 1980, pl. 15, figs. 1, 2.

Discussion.--Specimens assigned to this species are small, nearly as broad as wide. The early portion of the test is tapering and obscured by platelike costae and spines which cover the base of each chamber. Chambers of the last whorl are inflated and overlapping.

Types and occurrence.--USNM 262319, Willapa River section (138).

BULIMINA CORRUGATA Cushman and Siegfus, 1935

Bulimina corrugata Cushman and Siegfus, 1935, p. 92, pl. 14, fig. 7.--Smith, 1956, p. 95, pl. 13, fig. 7a-b.--Smith, 1957, p. 174, pl. 24, fig. 8a-b.--Lindquist, 1961, p. 101, pl. 6, fig. 5a-b.--Hamlin, 1962, p. 75.--Weaver, 1962, p. 378, pl. 3, fig. 5a-c.--Weaver and Weaver, 1962, p. 31, pl. 9, fig. 3.--Kleinpell and Weaver, 1963, p. 175, pl. 9, fig. 12.--McWilliams, 1965, p. 97, pl. 5, fig. 2.--Strong, 1967, p. 76, pl. 3, figs. 9-11.--Fairchild and others, 1969, p. 53, pl. 11, fig. 5.--McDougall, 1972, p. 115, pl. 3, fig. 16.--Tipton and others, 1973, p. 53, pl. 5, fig. 8a-b.--McDougall, 1980, pl. 14, figs. 15-17.

Discussion.--Specimens assigned to Bulimina corrugata are small, have triangular cross sections and indistinct chambers. This species differs from B. jacksonensis welcomensis Mallory because of the more rounded but still triangular cross section of B. corrugata.

Types and occurrence.--USNM 262317, Rock Creek section (66).

BULIMINA cf. B. INSTABILIS

Cushman and Parker, 1936

Discussion.--Specimens assigned to this species differ from the type because of the small size (length less than 0.4 mm) and the costae. The costae on these specimens are thin, low, numerous and partially obscure the chambers. This difference in the costae may be due to the preservation and redeposition of calcite on the test.

Types and occurrence.--USNM 262318, Willapa River section (40).

BULIMINA MACILENTA Cushman and Parker, 1939

Bulimina macilenta Cushman and Parker, 1939, p. 93.--Cushman and Parker, 1946, p. 98-99, pl. 23, figs. 2-3.--Loney, 1951, p. 77, pl. X, fig. 1.--Drugg, 1958, p. 95-96, pl. 5, figs. 5-6.--Hamlin, 1962, p. 75, pl. 5, fig. 9.--Weaver and Molander, 1964, p. 189, pl. 8, fig. 16.--McDougall, 1980, pl. 15, figs. 3, 4.

Bulimina denticulata Cushman and Parker (not B. truncana Gumbel var. denticulata Protescu, 1932), 1936, p. 42, pl. 7, figs. 7, 8.

Discussion.--This species is distinguished from others in this genus by the narrow flutings at the base of the chambers. The test is small, longer than wide.

Types and occurrence.--USNM 262320, Willapa River section (65).

BULIMINA MICROCOSTATA Cushman and Parker, 1936

Bulimina microcostata Cushman and Parker, 1936, p. 39, pl. 7, fig. 2.--Cushman and Parker, 1946, p. 95, pl. 22, fig. 9.--Hornaday, 1961, p. 188, pl. 6, fig. 2a-c.--Sullivan, 1962, p. 274, pl. 14, fig. 6a-b.--Weaver, 1962, p. 379, pl. 4, fig. 2a-c, 4a-c.--Kleinpell and Weaver, 1963, p. 175, pl. 9, fig. 13.--Weaver and Molander, 1964, p. 189, pl. 8, fig. 18.--DeLise, 1967, p. 34, pl. 3, fig. 7.--Fairchild and others, 1969, p. 54, pl. 11, fig. 10a-b.--Smith, 1971, p. 53, pl. 6, fig. 8a-b.--Tipton and others, 1973, p. 53, pl. 5, fig. 9a-b.--McDougall, 1980, pl. 15, fig. 7.

Discussion.--The test is elongated, about twice as long as broad, twists slightly with each whorl and is covered with numerous fine costae. The costae are thin and cover all but the last whorl.

Types and occurrence.--USNM 262322, Castor Creek section (17), Rock Creek section (67), Willapa River section (13).

BULIMINA SCULPTILIS LACINATA

Cushman and Parker, 1937

Bulimina sculptilis lacinata Cushman and Parker, 1937, p. 38, pl. 4, fig. 4.--Rau, 1951, p. 441, pl. 65, fig. 22.--Cushman and Parker, 1947, p. 103, pl. 24, fig. 13.--McDougall, 1972, p. 120, pl. 3, fig. 18.--McDougall, 1980, pl. 15, figs. 5, 6.

Bulimina sculptilis Cushman.--Cushman and Schenck, 1928, p. 311, pl. 42, fig. 16.--Wilson, 1954, p. 139, pl. 15, fig. 12a-b.--Smith, 1956, p. 95, pl. 12, fig. 9, pl. 5, fig. 4a-b.--Hornaday, 1961, p. 189, pl. 5, fig. 4a-b.--Sullivan, 1962, p. 274, pl. 14, fig. 8a-b.--Kleinpell and Weaver, 1963, p. 175, pl. 9, figs. 9, 10, 14.--Weaver and Molander, 1964, p. 190, pl. 9, figs. 3a-b, 4a-b.--DeLise, 1967, p. 35, pl. 3, fig. 9.--McDougall, 1972, p. 120, pl. 3, fig. 21.--Tipton and others, 1973, p. 53, pl. 5, fig. 11a-b.

Discussion.--Specimens from the study area have the more globose chambers and shorter test typical of this variety. Costae are poorly preserved.

Types and occurrence.--USNM 262321, Clark and Wilson well (27), Cooper Mountain well (47), Wolf Creek section (87), Rock Creek section (111), Willapa River section (3).

BULIMINA spp.

Discussion.--Broken, crushed or poorly preserved specimens not identifiable further than genus.

Types and occurrence.--Clatskanie well (49), Cooper Mountain well (3), Wolf Creek section (1U6), Castor Creek section (37), Rock Creek section (158).

Genus GLOBOBULIMINA Cushman, 1927

GLOBOBULIMINA PACIFICA Cushman, 1927

Globobulimina pacifica Cushman, 1927, p. 67, pl. 14, fig. 12.--Wilson, 1954, p. 139, pl. 15, fig. 14a-b.--Drugg, 1958, p. 100, pl. 5, figs. 28-29.--Carroll, 1959, p. 67.--Mumby, 1959, p. 86.--Hamlin, 1962, p. 77.--Weaver, 1962, p. 381, pl. 3, fig. 7a-c.--Weaver and Weaver, 1962, p. 32, pl. 9, fig. 15.--Kleinpell and Weaver, 1963, p. 176, pl. 9, fig. 11.--Strain, 1964, p. 79, pl. 3, fig. 16.--Weaver and Molander, 1964, p. 190, pl. 9, fig. 5.--McWilliams, 1965, p. 101, pl. 5, fig. 1.--Young, 1966, p. 113.--Strong, 1967, p. 80, pl. 3, fig. 20.--Carlson, 1969, p. 16.--Fairchild and others, 1969, p. 55, pl. 11, fig. 16a-b.--Smith, 1971, p. 54, pl. 7, fig. 1.

Discussion.--Specimens assigned to this species have a pear-shaped test, three overlapping chambers and a loop-shaped aperture. These specimens show an unusually strong tendency to preserve either by silica or pyrite replacement.

Types and occurrence.--Eugene section (8), Clark and Wilson well (37), Cooper Mountain well (27), Wolf Creek section (5), Castor Creek section (42), Rock Creek section (15), Willapa River section (27).

GLOBOBULIMINA spp.

Discussion.--These specimens are too poorly preserved to identify further than genus.

Types and occurrence.--Clatskanie well (10), Clark and Wilson well (99), Rock Creek section (115).

Genus PRAEGLOBOBULIMINA Hofker, 1953

PRAEGLOBOBULIMINA OVATA (d'Orbigny, 1846)

Bulimina ovata d'Orbigny, 1846, p. 185, pl. 11, figs. 13-14.--Cushman and Parker, 1947, p. 106-107, pl. 25, figs. 8, 9.--Mallory, 1959, p. 195, pl. 16, fig. 4.--Lindquist, 1961, p. 103, pl. 6, fig. 10a-c.--Sullivan, 1962, p. 274, pl. 14, fig. 7a-b.--Kleinpell and Weaver, 1963, p. 175, pl. 9, fig. 8.--McWilliams, 1965, p. 98, pl. 5, fig. 4.--Carlson, 1969, p. 13.--Tipton and others, 1973, p. 53, pl. 5, fig. 10a-b.

Praeglobobulimina ovata (d'Orbigny).--Fairchild and others, 1969, p. 55, pl. 11, fig. 19.

Discussion.--These specimens are globose, oval, and have medium to large tests. Chambers are inflated and strongly overlapping with the chambers of the last whorl covering 1/2 to 3/4 of the test. The broadest part of the test is about 1/2 to 1/3 of the length above the base.

Types and occurrence.--Clark and Wilson well (54), Cooper Mountain well (21), Castor Creek section (13), Rock Creek section (33), Willapa River section (46).

PRAEGLOBOBULIMINA cf. P. OVATA (d'Orbigny, 1846)

Discussion.--Specimens are crushed but appear to belong to this species.

Types and occurrence.--Rock Creek section (89).

PRAEGLOBOBULIMINA OVATA COWLITZENSIS (Beck, 1943)

Bulimina ovata cowlitzensis Beck, 1943, p. 605, pl. 107, fig. 22.--Hornaday, 1961, p. 189, pl. 5, fig. 3a-c.

Discussion.--These specimens are smaller and the chambers are not as overlapping as in Praeglobobulimina ovata.

Types and occurrence.--Rock Creek section (42).

PRAEGLOBOBULIMINA PUPOIDES (d'Orbigny, 1846)

Bulimina pupoides d'Orbigny, 1846, p. 185, pl. 11, figs. 11, 12.--Cushman and Parker, 1947, p. 105, pl. 25, figs. 3-7.--Drugg, 1958, p. 97-98, pl. 5, figs. 13-14.--Bagley, 1959, p. 82.--Carroll, 1959, p. 65-66.--Mallory, 1959, p. 191, pl. 28, fig. 16.--Hamlin, 1962, p. 76.--Carlson, 1969, p. 13.--McDougall, 1972, p. 118.--McDougall, 1980, pl. 15, figs. 8-10, 14.

Discussion.--Specimens assigned to this genus are cigar shaped. The test sides are nearly parallel and the initial end is blunt and round. Chambers are inflated and slightly overlapping although the sutures are not depressed. The test shape distinguishes this species from the preceding ones.

Types and occurrence.--USNM 262323, 262324, Clark and Wilson well (42), Wolf Creek section (33), Castor Creek section (36), Rock Creek section (90), Willapa River section (58).

PRAEGLOBOBULIMINA cf. P. PUPOIDES

(d'Orbigny, 1846)

Discussion.--This specimen is badly crushed and identification is not positive.

Types and occurrence.--Rock Creek section (91).

PRAEGLOBOBULIMINA spp.

Discussion.--Fragments or poorly preserved specimens which can only be identified to genus.

Types and occurrence.--Clatskanie well (74), Wolf Creek section (100).

Genus STAINFORTHIA Hofker, 1956

STAINFORTHIA sp.

Stainforthia sp.--McDougall, 1980, pl. 15, figs. 11-13.

Discussion.--These specimens have a triserial chamber arrangement; large apertural face; inflated and overlapping chambers; and a blunt initial end. The early chamber arrangement is not clearly seen. These specimens resemble squat pleurostomellids, i.e., Pleurostomella brevis and P. bierigi. This would be the first occurrence of this genus in the Eocene of North America.

Types and occurrence.--USNM 262325, 262326, 262327, Rock Creek section (97), Willapa River section (63).

Family UVIGERINA Haekel, 1894

Genus UVIGERINA d'Orbigny, 1826

Perhaps one of the more difficult but interesting benthic foraminiferal groups to work with is the uvigerinids. Classification and ecological studies on this group have resulted in a number of papers (Bandy, 1960; Lamb, 1964; Tipton and others, 1973; and Boersma, 1974) promoting each worker's views on the subject. This author favors the technique and methods used by Boersma (1974). According to this system the uvigerinids are classified in species groups, i.e., a collection species which are difficult to separate morphologically, are closely related. This concept is particularly useful when working with large populations and therefore innumerable variations and gradations between and within the species.

Boersma (1974) recognizes three categories of uvigerinids based on the type of ornamentation present, costate, hispid-costate and hispid. All three are represented within this study. The reader is referred to Boersma (1974) for specifics regarding these categories.

Synonymies with other works have not been made at the specific level because of the taxonomic problems with gradational species and the need to examine and measure the specimens.

UVIGERINA HISPIDA SPECIES GROUP

UVIGERINA GARZAENSIS Cushman and Siegfus, 1939

Uvigerina garzaensis Cushman and Siegfus, 1939, p. 28, pl. 6, fig. 15a, b.--
McDougall, 1980, pl. 16, figs. 1, 2.

Discussion.--This species group is composed of uvigerinids in which the hispid surface ornamentation varies from spinose to nodose. Biostratigraphically this group ranges from the Eocene to the Miocene, although individual

species have shorter ranges. The species name Uvigerina rustica Cushman and Edwards, 1938, is the senior synonym for the Eocene-Oligocene species which eventually evolves into U. hispida Schwager. Uvigerina garzaensis Cushman and Siegfus, 1939, is the California name for the same species. The species descriptions are quite similar (see Cushman and Edwards, 1938, and Cushman and Siegfus, 1939). Two points of difference are apparent in the type descriptions: 1) the coarse versus fine spines, and 2) the short versus long neck. Examination of samples from the study area of this paper shows that the specimens assigned to Uvigerina garzaensis increase the coarseness of the spines with depth and the length of the neck decreases. This trend was noted by Boersma (1974) who found that spinose forms have shorter necks and inhabit deeper water depths than do the nodose long-necked forms.

Types and occurrence.--USNM 262328, 262425, 262426, Castor Creek section (31), Rock Creek section (79), Willapa River section (10).

?UVIGERINA GARZAENSIS Cushman and Siegfus, 1939

Discussion.--Specimens are too poorly preserved to be certain of identification.

Types and occurrence.--Rock Creek section (58).

UVIGERINA GARDNERAE SPECIES GROUP

UVIGERINA YAZOOENSIS Cushman, 1933

Uvigerina yazoensis Cushman, 1933, pl. 13, pl. 1, fig. 29.--McDougall, 1980, pl. 16, fig. 3.

Discussion.--These specimens are rare in the study area so Boersma's (1974) statement that this species is a junior synonym of Uvigerina gardnerae Cushman cannot be confirmed. The similarities between these two species is

striking. Also the gradation from U. gardnerae to U. gardnerae texana to U. yazooensis seems quite plausible.

Types and occurrence.--USNM 262329, Rock Creek section (105).

UVIGERINA COCOAENSIS SPECIES GROUP

Uvigerina atwilli Cushman and Simonson, 1944, p. 200, pl. 33, figs. 3-4.

Uvigerina cocoaensis Cushman, 1925, p. 78, pl. 10, fig. 12.

Uvigerina jacksonensis Cushman, 1925, p. 67, pl. 10, fig. 13.

Uvigerina vicksburgensis Cushman and Ellisor, 1931, p. 54, pl. 7, fig. 7.

Uvigerina cocoaensis species group.--McDougall, 1980, pl. 16, figs. 4-13, pl. 17, figs. 1-10.

Discussion.--During this study an enormous number of specimens of the Uvigerina cocoaensis species group became available. These specimens suggest strong support for the species group concept. The group appears to be divisible into species on the basis of costae. Two features of the costae which are useful are the amount of the test covered by costae and the percentage of continuous or restricted costae. Considering just these two features the end members are roughly the species already designated:

Species	Amount of test covered	Costae	
		continuous	restricted
<u>U. atwilli</u>	1/4	100%	
<u>U. cocoaensis</u>	1/2 - all but last chamber	50%	
<u>U. jacksonensis</u>	all		50%
<u>U. vicksburgensis</u>	all		100%

This is acceptable on theoretical grounds but is not supported by population studies. Data from 100 measurements on specimens from one sample from the Rock Creek Section (KAM 249) illustrates this point (Table 1). The major variations noted in this study are: 1) 100 percent restriction of costae but not all of the test is covered, at least the last chamber is smooth (McDougall, 1980, pl. 16, figs. 6-10; pl. 18, fig. 13); 2) 50 percent or less of the costae are continuous and the entire test is covered (McDougall, 1980, pl. 16, fig. 11); 3) 100 percent restriction of costae and all of the test covered but the ornamentation of the last chamber becoming hispid rather than costate (McDougall, 1980, pl. 16, figs. 12, 13); 4) 100 percent continuous costae covering the entire test (McDougall, 1980, pl. 18, fig. 4); and 5) the tendency to become uniserial in the later stages (McDougall, 1980, pl. 17, fig. 5). These forms do not conveniently fit into any of the existing species, so rather than designating new species all specimens are lumped under the Uvigerina cocoaensis species group designation pending further study.

The one exception is the variation which tends to become hispid on the last chamber (McDougall, 1980, pl. 17, figs. 7-10). This has been listed on

Table 1. Uvigerinid measurements, Rock Creek section, Sample KAM 249.

Species	Length (mm)	Width (mm)	Costae		% of Test		% Costae	
			Chamber	Costae	Covered	Continuous	Restricted	Restricted
<u>U. vicksburgensis</u>	0.70	0.46	5-6		100	---	---	100
	0.76	0.40	3-10		100	---	---	100
	0.52	0.30	3-4		100	---	---	100
	0.80	0.40	3-8		100	---	---	100
	0.58	0.32	6-8		100	---	---	100
	0.70	0.32	5-9		100	---	---	100
	0.42	0.30	4		100	---	---	100
	0.40	0.30	3-4		100	---	---	100
	0.62	0.30	4-6		100	---	---	100
	0.90	0.36	3-6		100	---	---	100
	0.68	0.42	6-9		100	---	---	100
	0.78	0.40	4-8		100	---	---	100
	0.74	0.36	5-7		100	---	---	100
	0.82	0.36	6-7		100	---	---	100
	0.80	0.40	3-10		100	---	---	100

Table 1. Uvigerinid measurements, Rock Creek section, Sample KAM 249--continued.

Species	Length (mm)	Width (mm)	Costae Chamber	% of Test Covered	% Costae Continuous	Restricted
<u>U. vicksburgensis</u> (cont.)	0.70	0.34	3-6	100	---	100
	0.66	0.38	3-5	100	---	100
	0.80	0.36	3-8	100	---	100
	0.44	0.34	4-5	100	---	100
	0.52	0.36	3-4	100	---	100
	0.62	0.38	5-6	100	---	100
	0.60	0.36	3-8	100	---	100
	0.54	0.36	5-6	100	---	100
	0.58	0.34	5-8	100	---	100
	0.60	0.36	6-9	100	---	100
	0.70	0.32	5-7	100	---	100
	0.86	0.30	5-7	100	---	100
	0.58	0.40	6-7	100	---	100
	0.54	0.34	3-5	100	---	100

Table 1. Uvigerinid measurements, Rock Creek section, Sample KAM 249---continued.

Species	Length (mm)	Width (mm)	Costae Chamber	% of Test		% Costae	
				Covered	Continuous	Continuous	Restricted
<u>U. jacksonensis</u>	0.74	0.40	4-6	100	20	80	80
	0.64	0.36	4-6	100	33	67	67
	0.52	0.32	4	100	28	72	72
	0.52	0.36	3	100	18	82	82
	0.62	0.38	4-6	100	50	50	50
	0.88	0.32	3-6	100	45	55	55
	0.90	0.40	7-10	100	25	75	75
	0.62	0.34	3-10	100	25	75	75
	0.66	0.36	4-10	100	33	67	67
	0.62	0.38	3-6	100	47	53	53
	0.64	0.36	3-8	100	40	60	60
	0.64	0.36	4-5	100	24	76	76
	0.60	0.34	3-5	100	20	80	80

Table 1. Uvigerinid measurements, Rock Creek section, Sample KAM 249.

Species	Length (mm)	Width (mm)	Costae Chamber	% of Test Covered	% Costae Continuous	Restricted
<u>U. cocoaensis</u>	0.46	0.28	2-3	50	50	50
	0.80	0.40	5	50	50	50
	0.60	0.32	4-7	50	73	27
	0.52	0.30	4	50	58	42
	0.52	0.30	3	50	70	30
	0.62	0.36	3-8	50	61	39
	0.52	0.30	5	50	57	43
	0.76	0.38	3-5	50	61	39
	0.52	0.34	4-5	50	57	43
	0.60	0.36	4	50	50	50
	0.60	0.40	3-6	50	83	17
	0.80	0.38	6	50	70	30
	0.64	0.36	3-4	50	81	19
	0.66	0.32	3-6	50	50	50
	0.84	0.40	3-5	50	67	33

Table 1. Uvigerinid measurements, Rock Creek section, Sample KAM 249--continued.

Species	Length (mm)	Width (mm)	Costae Chamber	% of Test Covered	Continuous	% Costae Restricted
<u>U. cocoaensis</u> (cont.)	0.62	0.40	1-4	50	81	19
	0.48	0.24	3-4	50	90	10
	0.54	0.30	2-3	50	100	0
	0.38	0.16	3	50	67	33
	0.48	0.34	3-4	50	83	17
	0.44	0.40	3-4	50	75	25
	0.46	0.26	2-4	50	71	29
	0.64	0.34	3-5	50	67	33
	0.76	0.42	4-10	50	73	27
	0.56	0.34	3-4	50	54	46
	0.80	0.38	4	50	50	50
	0.70	0.40	3-4	50	72	28
	0.52	0.32	3-5	50	61	29
	0.50	0.42	2	50	50	50

Table 1. Uvigerinid measurements, Rock Creek section, Sample KAM 249--continued.

Species	Length	Width	Costae	% of Test		% Costae	
	(mm)	(mm)	Chamber	Covered	Continuous	Restricted	Restricted
<u>U. atwilli</u>	0.72	0.36	2-4	50	55	45	
	0.60	0.34	3	50	100	---	
Unknown	0.76	0.38	3-4	50	---	100	
	0.32	0.30	3	50	---	100	
	0.62	0.32	5-6	50	---	100	
	0.50	0.32	5	50	---	100	
	0.66	0.32	5-6	50	---	100	
	0.66	0.46	6	50	---	100	
	0.60	0.30	3-4	50	---	100	
	0.74	0.40	4-7	50	---	100	
	0.34	0.26	3	50	---	100	
	0.80	0.44	5-6	50	---	100	
0.80	0.40	3-6	50	---	100		
0.60	0.36	4-6	50	---	100		
0.56	0.32	3-6	100	75	25		

Table 1. Uvigerinid measurements, Rock Creek section, Sample KAM 249--continued.

Species	Length (mm)	Width (mm)	Costae Chamber	% of Test		% Costae	
				Covered	Continuous	Continuous	Restricted
Unknown (cont.)	0.62	0.38	4-6	100	50	50	50
	0.78	0.34	3-6	100	78	22	22
	0.68	0.30	3-8	100	75	25	25
	0.74	0.34	4-5	100	100	0	0
	0.82	0.36	3-5	100	100	0	0
	0.72	0.32	6-10	100	64	36	36
	0.68	0.40	3-4	100	72	28	28
	0.60	0.36	3-4	100	83	17	17
	0.90	0.34	2-3	100	100	0	0
	0.86	0.40	2-3	100	100	0	0
	0.80	0.34	2-4	100	100	0	0
	0.74	0.40	2-4	100	100	0	0
	0.70	0.32	4-7	50	31	69	69
	0.68	0.32	3-4	50	40	60	60
	0.66	0.34	2-3	50	25	75	75

80g

the checklists as Uvigerina sp. because of its ecologic significance. The species may actually fall into the Uvigerina rippensis species group of Boersma (1974).

Types and occurrence.--USNM 262330-262345, 262414, Eugene section (11), Cooper Mountain well (51), Wolf Creek section (89), Rock Creek section (153), Willapa River section (82, 83, 84).

UVIGERINA spp.

Discussion.--These specimens are fragmented or too poorly preserved to identify further than genus.

Types and occurrence.--Cooper Mountain well (57), Wolf Creek section (90).

?UVIGERINA sp.

Discussion.--The preservation is so poor that the generic assignment is in question.

Types and occurrence.--Cooper Mountain well (36), Wolf Creek section (48).

Genus TRIFARINA Cushman, 1923

TRIFARINA HANNAI (Beck, 1943)

Angulogerina hannai Beck, 1943, p. 607-08, pl. 108, figs. 26, 28.--Cushman, Stewart, and Stewart, 1948, p. 102, pl. 12, fig. 16.--Drugg, 1958, p. 107, pl. 6, figs. 7-8.--Bagley, 1959, p. 85.--McDougall, 1972, p. 129.

Discussion.--The specimens assigned to this species are distinctly triangular in cross section and without any ribs. The chambers are slightly inflated giving the test a lumpy appearance.

Types and occurrence.--USNM 262346, Clatskanie well (16), Clark and Wilson well (10), Wolf Creek section (115), Rock Creek section (60), Willapa River section (71).

Genus UVIGERINELLA Cushman, 1926

UVIGERINELLA OBESA (Cushman, 1926)

Uvigerina (Uvigerinella) obesa Cushman, 1926, p. 59, pl. 8, figs. 3, 7.

Discussion.--The test is quite small (0.2-0.3 mm in length) and covered with fine costae. The neck is short and often not present but distinguishable by a phialine lip or elevated rim surrounding the aperture.

Types and occurrence.--Willapa River section (151).

Superfamily DISCORBACEA Ehrenberg, 1838

Family DISCORBIDAE Ehrenberg, 1838

Subfamily DISCORBINAE Ehrenberg, 1838

Genus DISCORBIS Lamarck, 1804

DISCORBIS sp.

Discorbis sp.--McDougall, 1980, pl. 18, figs. 1-3.

Discussion.--The test is convexo-concave, and on the spiral side 2 to 3 previous whorls are visible. On the umbilical side flaps extend from the chambers into the umbo region. The final whorl has six chambers. Sutures are depressed and curved. The periphery is lobate and subacute. The maximum diameter ranges from 0.3-0.4 mm and the minimum ranges from 0.2-0.3 mm.

Types and occurrence.--USNM 262347, Wolf Creek section (97).

Genus BUCCELLA Anderson, 1952

BUCCELLA MANSFIELDI OREGONENSIS

(Cushman, Stewart, and Stewart, 1948)

Eponides mansfieldi var. oregonensis Cushman, Stewart, and Stewart, 1948, p. 48, pl. 6, fig. 5.--Rau, 1951, p. 447, pl. 66, figs. 14-16.

Discussion.--This species is assigned to the genus Buccella because of the granulations in the umbo and along the sutures.

Types and occurrence.--Cooper Mountain well (68).

Genus EPISTOMINELLA Hasezima and Maruhasi, 1944

EPISTOMINELLA PARVA (Cushman and Laiming, 1931)

Pulvinulinella parva Cushman and Laiming, 1931, p. 115, pl. 13, fig. 5.

Pseudoparrella parva (Cushman and Laiming).--Rau, 1951, p. 449, pl. 67, figs. 1, 2.

Epistominella parva (Cushman and Laiming).--McDougall, 1980, pl. 18, figs. 5, 6.

Discussion.--Specimens assigned to this species from the study area are small, usually less than 0.1 mm in diameter. Specimens are nearly flat on the spiral side and most have a small fine keel.

Types and occurrence.--USNM 262349, Willapa River section (68).

Subfamily BAGGININAE Cushman 1927

Genus VALVULINERIA Cushman, 1927

VALVULINERIA INVOLUTA Cushman and Dusenbury, 1934

Valvulineria involuta Cushman and Dusenbury, 1934, p. 63.--Smith, 1956, p. 97, pl. 14, fig. 4a-c.--Weaver, 1962, p. 382, pl. 5, fig. 6a-c.--DeLise, 1967, p. 38, pl. 4, fig. 1a-c.--McDougall, 1980, pl. 18, figs. 4, 7-11.

Discussion.--Specimens are small in size; coarsely perforate on dorsal side but no perforations are present on ventral side. This may be because specimens attach this side to a surface. Chambers rapidly expand in size and periphery rounded.

Types and occurrence.--USNM 262348, 262350, 262351, Clatskanie well (52), Wolf Creek section (70).

VALVULINERIA JACKSONENSIS WELCOMENSIS

Mallory, 1959

Valvulineria jacksonensis welcomensis Mallory, 1959, p. 231, pl. 20, figs. 3a, b, c, 5a, b, c.--Weaver, 1962, p. 383, pl. 5, fig. 3a-c.--Weaver and Molander, 1964, p. 193, pl. 10, fig. 9a-c.--McDougall, 1972, p. 133.--McDougall, 1980, pl. 19, figs. 1-6.

Discussion.--This species is common in the lower part of the sections and is easily identified by the test shape. This species is often identified as Cancris joaquinensis Smith. With additional work these two species will probably be found to be conspecific and therefore the senior synonym should be used with the generic correction--Valvulineria joaquinensis (Smith, 1956).

Types and occurrence.--USNM 262352, 262353, Cooper Mountain well (37), Castor Creek section (32), Rock Creek section (80), Willapa River section (23).

VALVULINERIA cf. V. MENLOENSIS Rau, 1951

Cibicidina hodgei (Cushman and Schenck).--Smith, 1971, p. 62, pl. 12, figs. 4a-c.

Discussion.--These specimens are at most one-half the size of Rau's smallest specimen (Rau, 1951). Because of the small size many of the characteristics have not developed; i.e., the sutures are not raised, chambers not inflated, and foramens have not developed.

Types and occurrence.--Clatskanie well (17), Clark and Wilson well (56), Cooper Mountain Well (45), Wolf Creek section (71), Willapa River section (149).

VALVULINERIA TUMEYENSIS

Cushman and Simonson, 1944

Valvulineria tumeyensis Cushman and Simonson, 1944, p. 201, pl. 33, figs. 13-14.--Hornaday, 1961, p. 191, pl. 9, fig. 1a-c, 2a-c, 3a-c, 4a-c.--Sullivan, 1962, p. 280, pl. 17, figs. 3a-c, 4a-b, 5a-b, 6a-c.--Weaver, 1962, p. 383, pl. 5, fig. 8a-c.--Weaver and Weaver, 1962, p. 36, pl. 12, fig. 1a-c.--Kleinpell and Weaver, 1963, p. 178, pl. 11, fig. 2a-c.--Weaver and Molander, 1964, p. 193, pl. 11, figs. 1a-c, 2a-c, 3a-c.--Tipton and others, 1973, p. 59, pl. 9, figs. 3a-c.--McDougall, 1980, pl. 19, figs. 7-9, pl. 20, figs. 1-3.

?Valvulineria tumeyensis Cushman and Simonson.--Smith, 1971, p. 57, pl. 8, figs. 8a-c.

Discussion.--These specimens are easily recognized by the inflated, globose test. The tests are frequently subjected to predation.

Types and occurrence.--USNM 262354, 262355, 262424, Castor Creek section (33), Rock Creek section (81), Willapa River section (12).

VALVULINERIA cf. V. TUMEYENSIS

Cushman and Simonson, 1944

Discussion.--The poor preservation of these specimens prevents a positive identification. The general shape of the test is globose and similar to that of V. tumeyensis.

Types and occurrence.--Cooper Mountain Well (38).

VALVULINERIA WILLAPAENSIS Rau, 1951

Valvulineria willapaensis Rau, 1951, p. 447, pl. 66, figs. 23-25.--Drugg, 1958, p. 111, pl. 6, figs. 33-35.--Bagley, 1959, p. 89.--Carroll, 1959, p. 73.--Mumby, 1959, p. 93-94, pl. 5, figs. 23a-b.--McWilliams, 1965, p. 105, pl. 6, fig. 12.

Discussion.--This species is not well developed in any of the samples from the study sections. Most specimens are slightly smaller than Rau's specimens (Rau, 1951) and the preservation has obscured some of the features.

Types and occurrence.--USNM 262413, Cooper Mountain well (53), Willapa River section (137).

VALVULINERIA sp.

Types and occurrence.--Willapa River section (117).

Family ASTERIGERINIDAE d'Orbigny, 1839

Genus ASTERIGERINA d'Orbigny, 1839

ASTIGERINA CRASSAFORMIS

Cushman and Siegfus, 1935

Asterigerina crassaformis Cushman and Siegfus, 1935, p. 94, pl. 14, fig. 10.--
Smith, 1957, p. 186, pl. 28, figs. 7a-c, 10a-c.--Drugg, 1958, p. 120, pl. 8, figs. 10-12.--Lindquist, 1961, p. 121.--Hamlin, 1962, p. 85.--
Sullivan, 1962, p. 282, pl. 20, fig. 3a-c.--Fairchild and others, 1969, p. 60, pl. 15, fig. 8a-c.--Smith, 1971, p. 58, pl. 9, figs. 4a-c.--
McDougall, 1972, p. 135.--Tipton and others, 1973, p. 61, pl. 10, fig. 2a-c.

Discussion.--These specimens are poorly preserved. The test diameter ranges from 0.3 to 0.4 mm and has the supplementary chambers around the shell material which fills the umbo.

Types and occurrence.--Rock Creek section (147).

Superfamily ROTALIACEA Ehrenberg, 1839

Family ELPHIDIIDAE Galloway, 1933

Subfamily ELPHIDIINAE Galloway, 1933

Genus ELPHIDIUM De Montfort, 1808

ELPHIDIUM CALIFORNICUM Cook, in Mallory, 1959

Elphidium californicum Cook, 1950, p. 63, pl. 2, fig. 9a, b.--Mallory, 1959, p. 184, pl. 15, fig. 10a-b, pl. 33, fig. 8a-b.--McDougall, 1980, pl. 20, figs. 4, 5.

Elphidium cf. E. californicum Cook.--Sullivan, 1962, p. 268, pl. 11, fig. 13a-b.--Fairchild and others, 1969, p. 60, pl. 15, fig. 6a-b.--Tipton and others, 1973, p. 50, pl. 4, fig. 5.

Discussion.--Specimens assigned to this species can be easily distinguished from others in this study area by the acute periphery, umbo plug, and greater number of chambers, usually 15-20.

Types and occurrence.--USNM 262356, Eugene section (1), Clark and Wilson well (7).

ELPHIDIUM MINUTUM (Reuss, 1865)

Polystomella minuta Reuss, 1865, p. 478, pl. 4, fig. 6a-b.

Elphidium minutum (Reuss).--Rau, 1951, p. 437-438, pl. 64, figs. 9, 10.--
McDougall, 1980, pl. 20, figs. 6, 9.

Discussion.--The test is nearly circular in outline; diameters range from 0.2 to 0.5 mm. There are 10-15 gradually enlarging chambers in the last whorl. Sutures are slightly depressed. The retral processes are small, evenly spaced, and average about 14 per suture. The periphery is broadly rounded. The umbilical region has granules of calcite.

Types and occurrence.--USNM 262357, Eugene section (5), Clatskanie well (2), Clark and Wilson well (55), Cooper Mountain well (44).

ELPHIDIUM sp.

Discussion.--A single specimen with a very lobate periphery and depressed umbo. This may be an aberrant form of Elphidium minutum (Reuss).

Types and occurrence.--Clark and Wilson well (98).

ELPHIDIUM cf. E. TEXANUM

(Cushman and Applin, 1926)

Elphidium cf. E. texanum (Cushman and Applin).--McDougall, 1980, pl. 20, figs. 7, 8.

Discussion.--This specimen is identical with the type except that the umbilical region is much larger and filled with granules of calcite. The diameter is 0.22 mm.

Types and occurrence.--USNM 262358, Castor Creek section (4).

Superfamily GLOBIGERINACEAE Carpenter, Parker, and Jones, 1862

Family HETEROHELICIDAE Cushman, 1927

Subfamily HETEROHELICINAE Cushman, 1927

Genus CHILOGUEMBELINA Loeblich and Tappan, 1956

CHILOGUEMBELINA CUBENSIS (Palmer, 1934)

Gumbelina cubensis Palmer, 1934, p. 74, fig. 1-6.

Chiloguembelina cubensis (Palmer).--McKeel and Lipps, 1972, p. 91, pl. III, fig. 6a-b.--McKeel and Lipps, 1975, p. 266, pl. 5, fig. 3a-b.--Poore and Brabb, 1977, p. 255.--McDougall, 1980, pl. 21, fig. 1.

Types and occurrence.--USNM 262359, Rock Creek section (188), Willapa River section (183).

Family HANTKENINIDAE Cushman, 1927

Subfamily HASTIGERININAE Bolli, Loeblich, and Tappan, 1957

Genus PSEUDOHASTIGERINA Banner and Blow, 1959

PSEUDOHASTIGERINA LILLSI (Church, 1931)

Pullenia lillsi Church, 1931, p. 209, pl. A, fig. 10.

Pseudohastigerina lillsi (Church).--McKeel and Lipps, 1975, p. 261, pl. 3, figs. 7a-b, pl. 4, figs. 5a-c.--Poore and Brabb, 1977, p. 269.

Types and occurrence.--Rock Creek section (181).

PSEUDOHASTIGERINA MICRA (Cole, 1927)

Nonion micrus Cole, 1927, p. 22, pl. 5, fig. 12.--Drugg, 1958, p. 93, pl. 4, figs. 3-5.

Nonion micrum Cole.--Bagley, 1959, p. 77.--Mallory, 1959, p. 101, pl. 15, fig. 3a-b, pl. 28, fig. 12a-b.--Lindquist, 1961, p. 63, pl. 4, fig. 5a-b.

Globigerinella micra (Cole, in part).--Sullivan, 1962, p. 285, pl. 22, figs. 7a-b, 8a-b.

Hastigerina micra (Cole).--Fairchild and others, 1969, p. 60, pl. 15, figs. 1a-c, 7a-c.

Globoanomalina micra (Cole).--Smith, 1971, p. 59.--McDougall, 1972, p. 137.

Pseudohastigerina micra (Cole).--McKeel and Lipps, 1972, pl. I, fig. 6a-b.--Poore and Brabb, 1977, p. 269.

Types and occurrence.--Clatskanie well (79), Clark and Wilson well (101), Cooper Mountain well (83), Rock Creek section (182).

Family GLOBOROTALIIDAE Cushman, 1927

Subfamily GLOBOROTALIINAE Cushman, 1927

Genus GLOBOROTALIA Cushman, 1927

GLOBOROTALIA INSOLITA Jenkins, 1966

Globorotalia insolita Jenkins, 1966, p. 1120, fig. 13, nos. 113-118.--McDougall, 1980, pl. 21, figs. 2-9, pl. 22, figs. 1-3.

Globorotalia gemma Jenkins.--Rooth, 1974, p. 192, pl. 8, figs. 13, 15.

Globorotalia cf. G. gemma Jenkins.--Rooth, 1974, p. 193, pl. 7, figs. 29-31.

Discussion.--The test is a small, trochospiral coil with five chambers visible on the umbilical side and three whorls visible on the spiral side. The wall is calcareous, finely perforate, and smooth except in weathered specimens. The periphery is broadly rounded without keel. In side view the periphery is lobate and the sutures are depressed and curved. The aperture is an interiomarginal loop-shaped opening which is bordered by a lip or raised rim. The last chamber protrudes into the umbilical region and develops what appears to be an accessory aperture. The generic designation is in question because of the apertural character. Also the stratigraphic range is unknown. Specimens of the calcareous nannofossil, Ismolithus recurvus, have been found on the test.

Types and occurrence.--USNM 262360-262363, 262415- 262419, Wolf Creek section (120), Rock Creek section (185).

Family GLOBIGERINIDAE Carpenter, Jones, and Jones, 1862

Subfamily GLOBIGERININAE Carpenter, Parker, and Jones, 1862

Genus GLOBIGERINA d'Orbigny, 1826

GLOBIGERINA AMPLIAPERTURA Bolli, 1957

Globigerina ampliapertura Bolli, 1957, p. 108, pl. 22, fig. 5a-7b.--Poore and Brabb, 1977, p. 255, pl. 1, figs. 7-9.

Types and occurrence.--Willapa River section (186).

GLOBIGERINA cf. G. AMPLIAPERTURA Bolli, 1957

Types and occurrence.--Willapa River section (191).

GLOBIGERINA ANGIPOROIDES ANGIPOROIDES

Hornibrook, 1965

Globigerina angiporoides Hornibrook, 1965, p. 835, figs. 1a-i, 2.--Poore and Brabb, 1977, p. 255, pl. 1, figs. 1, 4.

Types and occurrence.--Willapa River section (166).

GLOBIGERINA cf. G. ANGIPOROIDES ANGIPOROIDES

Hornibrook, 1965

Types and occurrence.--Rock Creek section (176).

GLOBIGERINA ANGIPOROIDES MINIMA Jenkins, 1966

Globigerina angiporoides minima Jenkins, 1966, p. 1096, fig. 7, 52-57.--McDougall, 1980, pl. 22, fig. 8.

Globigerina minima Jenkins.--McKeel and Lipps, 1972, p. 89, pl. III, fig. 2a-c.--Poore and Brabb, 1977, p. 255, pl. 1, figs. 5-6.

Types and occurrence.--USNM 262364, Rock Creek section (173), Willapa River section (162).

GLOBIGERINA ANGUSTIUMBILICATA Bolli, 1957

Globigerina ciperensis angustiumbilicata Bolli, 1957, p. 109, pl. 22, figs. 12-13.--McKee and Lipps, 1972, p. 87, pl. II, 3a-c.--Poore and Brabb, 1977, p. 255, pl. 8, fig. 6.

Types and occurrence.--Willapa River section (178).

GLOBIGERINA EUAPERTURA Jenkins, 1960

Globigerina euapertura Jenkins, 1960, p. 351, pl. 1, fig. 8a-c.--McKee and Lipps, 1972, p. 87, pl. II, fig. 5a-c.

Types and occurrence.--Willapa River section (187).

GLOBIGERINA GALAVISI Bermudez, 1961

Globigerina galavisi Bermudez, 1961, p. 1183, pl. 4, fig. 3.

Types and occurrence.--Willapa River section (189).

GLOBIGERINA OFFICINALIS Subbotina, 1953

Globigerina officinalis Subbotina, 1953, p. 78, pl. 11, figs. 1-7.

Types and occurrence.--Rock Creek section (183), Willapa River section (176).

GLOBIGERINA OUACHITAENSIS Howe and Wallace, 1932

Globigerina ouachitaensis Howe and Wallace, 1932, p. 83, pl. 12, figs. 18-19.--Poore and Brabb, 1977, p. 256, pl. 5, figs. 1, 2.

Types and occurrence.--Rock Creek section (189), Willapa River section (173).

GLOBIGERINA PRAEBULLOIDES Blow, 1959

Globigerina praebulloides Blow, 1959, p. 180, pl. 8, fig. 47, pl. 9, fig. 48.--
-McKeel and Lipps, 1972, p. 89, pl. II, fig. 6a-d.--McKeel and Lipps,
1975, p. 265, pl. 5, fig. 5a-c, 6a-c.--Poore and Brabb, 1977, p. 256, pl.
7, figs. 6-7.

Types and occurrence.--Wolf Creek section (122), Willapa River section
(185).

GLOBIGERINA cf. G. PRAEBULLOIDES Blow, 1959

Types and occurrence.--Rock Creek section (190).

GLOBIGERINA PRAETURRITILINA Blow and Banner, 1962

Globigerina turritilina praeturritilina Blow and Banner, 1962, p. 99, pl.
XIII, figs. A-C.

Globigerina praeturritilina Blow and Banner.--McKeel and Lipps, 1972, p. 90,
pl. III, fig. 1a-d.--Poore and Brabb, 1977, p. 256.

Types and occurrence.--Willapa River section (167).

GLOBIGERINA PSEUDOVENEZUELANA Blow and Banner, 1962

Globigerina yeguaensis pseudovenezuelana Blow and Banner, 1962, p. 100, pl.
XI, figs. J-L, N, O.

Globigerina pseudovenezuelana Blow and Banner.--Poore and Brabb, 1977, p.
256, pl. 4, figs. 8-9.

Types and occurrence.--Rock Creek section (178), Willapa River section
(163).

GLOBIGERINA cf. G. PSEUDOVENEZUELANA

Blow and Banner, 1962

Types and occurrence.--Willapa River section (188).

GLOBIGERINA SENILIS Bandy, 1949

Globigerina ouachitaensis senilis Bandy, 1949, p. 121, pl. 22, figs. 5a-c.

Globigerina senilis Bandy.--McKeel and Lipps, 1972, p. 90, pl. III, fig. 3a-c.--McKeel and Lipps, 1975, p. 262, pl. 4, figs. 2a-c.--Poore and Brabb, 1977, p. 256, pl. 8, figs. 10-11.

Types and occurrence.--Rock Creek section (179), Willapa River section (175).

GLOBIGERINA cf. G. SENILIS Bandy, 1949

Types and occurrence.--Willapa River section (174).

GLOBIGERINA sp

Globigerina sp.--McDougall, 1980, pl. 22, fig. 9.

Types and occurrence.--USNM 262365, Rock Creek section (174).

GLOBIGERINA spp.

Discussion.--This group includes fragments or poorly preserved specimens which cannot be reliably identified and may or may not be this genus.

Types and occurrence.--Clatskanie well (80), Clark and Wilson well (100), Cooper Mountain well (82), Wolf Creek section (117), Rock Creek section (172), Willapa River section (172).

GLOBIGERINA TAPURIENSIS Blow and Banner, 1962

Globigerina tripartita tapuriensis Blow and Banner, 1962, in Eames and others, p. 97, pl. X, figs. H-K.

Types and occurrence.--Rock Creek section (186).

GLOBIGERINA TRIPARTITA (Koch, 1926)

Globigerina bulloides tripartita Koch, 1926, p. 746, fig. 21.--Poore and Brabb, 1977, p. 256.

Types and occurrence.--Rock Creek section (187), Willapa River section (169).

GLOBIGERINA cf. G. TRIPARTITA (Koch, 1926)

Types and occurrence.--Cooper Mountain well (80).

GLOBIGERINA UTILISINDEX Jenkins and Orr, 1973

Globigerina utilisindex Jenkins and Orr, 1973, p. 133, pl. 1, figs. 1-6, pl. 2, figs. 1-9, pl. 3, figs. 1-3.--Poore and Brabb, 1977, p. 256, pl. 7, figs. 8-10.

Types and occurrence.--Rock Creek section (184), Willapa River section (177).

Genus GLOBOROTALOIDES Bolli, 1957

GLOBOROTALOIDES sp.

Types and occurrence.--Rock Creek section (192).

?GLOBOROTALOIDES sp

Discussion.--The preservation is not good, however, the wall is coarse reticulate surface typical of Globorotaloides.

Types and occurrence.--Wolf Creek section (119).

GLOBOROTALOIDES SUTERI Bolli, 1957

Globorotaloides suteri Bolli, 1957, p. 117, pl. 27, figs. 9a-13b.--Poore and Brabb, 1977, p. 260, pl. 1, figs. 11-13.

Types and occurrence.--Rock Creek section (191), Willapa River section (170).

GLOBOROTALOIDES cf. G. SUTERI Bolli, 1957

Types and occurrence.--Cooper Mountain well (81), Willapa River section (164).

Genus SUBBOTINA Brotzen and Pozaryska, 1961

SUBBOTINA LINAPERTA (Finlay, 1939)

Globigerina linaperta Finlay, 1939, p. 125, pl. 13, figs. 54-57.--McKeel and Lipps, 1972, p. 87, pl. 1, fig. 3a-c.--McKeel and Lipps, 1975, p. 262, pl. 3, fig. 4a-c.

Subbotina linaperta (Finlay) Poore and Brabb, 1977, p. 269, pl. 5, figs. 8-9.

Types and occurrence.--Willapa River section (165).

SUBBOTINA cf. S. LINAPERTA (Finlay, 1939)

Types and occurrence.--Rock Creek section (177), Willapa River section (171).

Subfamily CATAPSYDRACINAE

Bolli, Loeblich, and Tappan, 1957

Genus CATAPSYDRAX Bolli, Loeblich, and Tappan, 1957

CATAPSYDRAX DISSIMILIS Cushman and Bermudez, 1937

Catapsydrax dissimilis Cushman and Bermudez, 1937, p. 25, pl. 3, figs. 4-6.

Types and occurrence.--Willapa River section (190).

CATAPSYDRAX GORTANII Borsetti, 1959

Catapsydrax gortanii Borsetti, 1959, p. 205, pl. I, fig. 1a-c.

Types and occurrence.--Willapa River section (182).

CATAPSYDRAX PRIMITIVUS (Blow and Banner, 1962)

Globigerinita unicava primitiva Blow and Banner, 1962, p. 114, pl. XIV, figs. J-L.

Catapsydrax primitiva (Blow and Banner) McKeel and Lipps, 1975, p. 261, pl. 2, figs. 5a-c.

Types and occurrence.--Willapa River section (168).

CATAPSYDRAX cf. C. PRIMITIVUS (Blow and Banner, 1962)

Types and occurrence.--Rock Creek section (175), Willapa River section (181).

CATAPSYDRAX UNICAVUS Bolli, Loeblich, and Tappan, 1957

Catapsydrax unicavus Bolli, Loeblich, and Tappan, 1957, p. 37, pl. 7, figs. 9a-c.

Types and occurrence.--Willapa River section (180).

CATAPSYDRAX cf. C. UNICAVUS Bolli,

Loeblich, and Tappan, 1957

Types and occurrence.--Willapa River section (184).

Genus GLOBIGERINATHEKA Bronnimann, 1952

GLOBIGERINATHEKA INDEX (Finlay, 1939)

Globigerinoides index Finlay, 1939, p. 125, pl. 14, figs. 85-88.--McKeel and Lipps, 1975, p. 265, pl. 3, figs. 5a-c, pl. 5, figs. 1a-c.

Globigerinatheka index (Finlay).--Poore and Brabb, 1977, p. 259, pl. 4, figs. 5-6.

Types and occurrence.--Wolf Creek section (121), Rock Creek section (180), Willapa River section (179).

?GLOBIGERINATHEKA sp.

Types and occurrence.--Wolf Creek section (118).

Superfamily ORBITOIDACEA Schwager, 1876

Family EPONIDIDAE, Hofker, 1951

Genus EPONIDES De Montfort, 1808

EPONIDES MEXICANUS (Cushman, 1925)

Pulvinulina mexicana Cushman, 1925, p. 300.

Eponides mexicana (Cushman).--Mallory, 1959, p. 237-238, pl. 37, fig. 11a-c, pl. 41, fig. 9a-c.--Smith, 1957, p. 183, pl. 27, fig. 10a-c.--Weaver and Weaver, 1962, p. 37, pl. 13, fig. 4a-c.

Eponides mexicanus (Cushman).--McDougall, 1980, pl. 23, figs. 1-9.

Eponides quayabalensis Cole, 1927, p. 29, pl. 2, figs. 17-19.

Eponides quayabalensis Cole var. yequaensis Weinzierl and Applin, 1929, p. 406, pl. 42, fig. 2a-c.--Beck, 1943, p. 608, pl. 108, figs. 1, 4.

Eponides frizzelli Kleinpell, 1938, p. 318, pl. 2, figs. 12, 15-16.--Kleinpell and Weaver, 1963, p. 179, pl. 12, fig. 1a-c.

Eponides kleinpelli Cushman and Frizzell, 1940, p. 42, pl. 8, fig. 11a-c.--Rau, 1948, p. 172, pl. 31, figs. 6-8.--Rau, 1951, p. 447, pl. 66, figs. 12, 13.--Sullivan, 1962, p. 281, pl. 19, figs. 1a-c, 2a-c.--Fairchild and others, 1969, p. 63, pl. 17, fig. 7a-c.--Smith, 1971, p. 61, pl. 9, fig. 2a-c.--Tipton and others, 1972, p. 60, pl. 9, fig. 4a-c.

Eponides gaviotaensis Wilson, 1954, p. 143, pl. 16, figs. 11-12.--Smith, 1956, p. 98, pl. 15, fig. 1a-c.--Hornaday, 1961, p. 192, pl. 10, fig. 1a-c.--Kleinpell and Weaver, 1963, p. 179, pl. 11, fig. 4a-c, pl. 12, fig. 2a-c.--Weaver and Molander, 1964, p. 193, pl. 12, fig. 1a-c.

Discussion.--This group of species represents extreme oversplitting of the species Eponides mexicanus (Cushman). Characteristics which were erected to differentiate these species are listed in Table 2. The only points of difference are size and number of chambers in the final whorl. The variation of size and number of chambers are actually a normal population of one species rather than six discreet forms. The stratigraphic value associated with these species needs to be reevaluated. Specimens which should evolutionarily and

Table 2. Comparison of late Eocene Eponides species characteristics.

Species	<u>E. mexicanus</u>	<u>E. quayabalensis</u>	<u>E. quayabalensis</u>	<u>E. frizzelli</u>	<u>E. kleinpelli</u>	<u>E. gaviotaensis</u>
Characteristics	(Cushman, 1925)	Cole, 1927	<u>yequaensis</u> Weinzerl and Applin, 1929	Kleinpell, 1938	Cushman and Frizzell, 1940	Wilson, 1954

Biconvexity	unequal	unequal	unequal	nearly equal	unequal	unequal
Periphery	subacute	subcarinate	subacute	subacute	blunt keel	subacute
Chambers	---	12-14	9-10	8-12	15	10-12
Sutures						
ventral	slightly depressed	nearly straight	radiate	slightly depressed,	depressed,	nearly radial,
dorsal	---	nearly straight	angular	depressed,	nearly straight	slight curve
Umbilicus	ring of shell material	ring of clear shell material	ring of clear shell material	curved	slight curve	slight curve
				---	cluster of	cluster of
					raised bosses	raised bosses,
						forms ring
Size						
diameter	0.60 mm	0.82 mm	---	1.60 mm	1.35 mm	0.54 mm
thickness	---	0.52 mm	---	0.83 mm	0.70 mm	0.84 mm

stratigraphically be separate from each other frequently occur in the same sample. Their appearance is more directly controlled by environmental factors, i.e., amount of sedimentation, stability of the environment, and so on. The fifteen-chambered forms are not found unless a sizable population of smaller forms are present. Large forms more than likely indicate environmental conditions which were stabilized long enough that gerontic forms developed.

Types and occurrence.--USNM 262366-262368, Eugene section (6), Clatskanie well (14), Clark and Wilson well (14), Cooper Mountain well (10), Wolf Creek section (4), Rock Creek section (14), Willapa River section (100).

EPONIDES cf. E. MEXICANUS (Cushman, 1925)

Discussion.--These are poorly preserved or fragments which have the size and shape of Eponides mexicanus (Cushman).

Types and occurrence.--Clark and Wilson well (8), Cooper Mountain well (78), Rock Creek section (102).

?EPONIDES sp.

Discussion.--This group contains only siliceous molds which probably belong in this genus.

Types and occurrence.--Cooper Mountain well (72), Rock Creek (161).

Family CIBICIDIDAE Cushman, 1927

Subfamily CIBICIDINAE Cushman, 1927

Genus CIBICIDES De Montfort, 1808

CIBICIDES ELMAENSIS Rau, 1948

Cibicides elmaensis Rau, 1948, p. 173, pl. 31, figs. 18-26.--Loney, 1951, p. 83, pl. X, fig. 5.--Rau, 1951, p. 451, pl. 67, figs. 15-17.--Drugg, 1958, p. 130, pl. 9, figs. 33-35.--Carroll, 1959, p. 82.--Mumby, 1959, p. 108.--Strain, 1964, p. 89, pl. 5, figs. 9-11.--Strong, 1967, p. 99, pl. 4, figs. 27-29.--Fairchild and others, 1969, p. 65, pl. 19, figs. 8a-c, 10a-c.--McDougall, 1972, p. 151.--Tipton and others, 1973, p. 65, pl. 13, fig. 5a-c.--McDougall, 1980, pl. 23, figs. 10-12, pl. 24, figs. 1-3.

Cibicides elmaensis? Rau.--Loney, 1951, p. 83, pl. X, fig. 5.--Strong, 1967, p. 99, pl. 4, figs. 27-20.

Discussion.--Rau (personal communication) has been able to distinguish Refugian and Zemorrian forms of this species (Rau, 1948, p. 168, pl. 31).

fig. 18, 19, 20, Refugian form - characteristic of importance is the deep concavity of the ventral side rather as a moat around the central disc."

"fig. 21, 22, 23, Zemorrian form - characteristic of importance is the convexity from edge to edge (ventral side) the form is called Cibicides pyrolusida by some workers."

"fig. 24, 25, 26, extreme Refugian form - found only when there is a great abundance of Cibicides, not common but found with typically Refugian assemblages."

The specimens of Cibicides elmaensis from the study area also develop these three characteristic forms, but not as a response to time. These forms are related to depth. The Zemorrian form represents the deep water form and is present throughout the entire middle bathyal Willapa River section. The Refugian forms are representative of the upper bathyal and neritic zones.

Types and occurrence.--USNM 262369, 262370, Cooper Mountain well (54), Wolf Creek section (2), Rock Creek section (113), Willapa River section (90).

CIBICIDES FORTUNATUS Martin, 1943

Cibicides fortunatus Martin, 1943, p. 121, pl. 8, fig. 5.--Drugg, 1958, p. 131, pl. 9, figs. 30-32.--Bagley, 1959, p. 100, pl. 6, figs. 16-21.--Mallory, 1959, p. 265, pl. 24, fig. 1a-c.--Thoms, 1959, p. 86, pl. 6, fig. 7a-c.--Lindquist, 1961, p. 135, pl. 11, fig. 2a-c.--McDougall, 1980, pl. 24, figs. 10, 11.

Discussion.--Except for a smaller maximum diameter (usually less than 0.35 mm) specimens assigned to this species are identical to the holotype. The umbilical boss is frequently but not always covered with granular material.

Types and occurrence.--USNM 262373, Willapa River section (41).

CIBICIDES HAYDONI (Cushman and Schenck, 1928)

Planulina haydoni Cushman and Schenck, 1928, p. 316, pl. 45, figs. 7a-c.--Wilson, 1954, p. 144, pl. 17, fig. 3a-c.--Smith, 1956, p. 100, pl. 16, fig. 5a-c.--Sullivan, 1962, p. 286, pl. 23, figs. 1a-c, 2, c.

Cibicides haydoni (Cushman and Schenck).--Kleinpell and Weaver, 1963, p. 181, pl. 14, fig. 3a-c.--Tipton and others, 1973, p. 65.--McDougall, 1980, pl. 24, figs. 4-6.

Discussion.--This species is distinguished from C. natlandi by the protruding umbilical region. In the Clark and Wilson well, many specimens are transitional forms which indicate evolution of this species from C. natlandi.

Types and occurrence.--USNM 262371, Clark and Wilson well (72), Wolf Creek section (3), Rock Creek section (111).

CIBICIDES LOBATULUS (Walker and Jacob, 1798)

Nautilus lobatulus Walker and Jacob, in Kammacher, 1798, p. 642, pl. 14, fig. 36.

Discussion.--The specimens assigned to this species show evidence of being attached during life. The chambers are inflated and globose but not as much as Holocene specimens.

Types and occurrence.--Wolf Creek section (73), Rock Creek section (166).

CIBICIDES MCMASTERSI Beck, 1943

Cibicides mcmastersi Beck, 1943, p. 612, pl. 109, figs. 2, 4, 15.--Drugg, 1958, p. 133-134, pl. 10, figs. 13-15, 19-21.--Bagley, 1959, p. 102-103, pl. 6, figs. 25-27.--Carroll, 1959, p. 84.--Mumby, 1959, p. 109-110, pl. 7, fig. 9a-c.--Thoms, 1959, p. 87, pl. 7, fig. 3a-c.--Lindquist, 1961, p. 137, pl. 11, figs. 6a-c.--McWilliams, 1965, p. 114, pl. 5, figs. 22-23.

Discussion.--This species can be distinguished from other Cibicides in this study by the prominent umbilical plug which dominates the umbilical side of the test.

Types and occurrence.--Clatskanie well (12)^f, Clark and Wilson well (35), Cooper Mountain well (5), Willapa River section (67).

CIBICIDES NATLANDI Beck, 1943

Cibicides natlandi Beck, 1943, p. 612, pl. 109, figs. 1, 5, 13.--Rau, 1951, p. 452, pl. 67, figs. 26, 27.--Hornaday, 1961, p. 195, pl. 13, figs. 2a-c, 3a-c, 4a-c.--Kleinpell and Weaver, 1963, p. 182, pl. 16, fig. 2a-b.--Weaver and Molander, 1964, p. 200, pl. 18, fig. 4a-c.--DeLise, 1967, p. 42, pl. 7, figs. 3a-c.--McDougall, 1980, pl. 24, figs. 7-9.

Discussion.--See comments under Cibicides haydoni (Cushman and Schenck, 1928).

Types and occurrence.--USNM 262372, Clatskanie well (4), Clark and Wilson well (6), Cooper Mountain well (6), Wolf Creek section (40), Castor Creek section (48), Rock Creek section (8).

CIBICIDES NATLANDI OLEQUAENSIS Beck, 1943

Cibicides natlandi Beck subspecies olequaensis Beck, 1943, p. 612, pl. 109, fig. 3, 20, 22.

Discussion.--Specimens from the Keasey Formation have a lobate periphery, but are the same size as Cibicides natlandi.

Types and occurrence.--Rock Creek section (43).

CIBICIDES PSEUDOUNGERIANUS EVOLUTUS

Cushman and Hobson, 1935

Cibicides pseudoungerianus (Cushman) var. evolutus Cushman and Hobson, 1935, p. 64, pl. 9, fig. 11.

Discussion.--These are not well-preserved specimens. The chambers tend to be longer than broad and the periphery is not smooth.

Types and occurrence.--Rock Creek section (68).

CIBICIDES sp.

Discussion.--This species has a convex ventral side, a flat dorsal side with two whorls showing, limbate sutures, 10 chambers in the final whorl, and is coarsely perforate.

Types and occurrence.--Castor Creek section (44), Rock Creek section (9).

CIBICIDES spp.

Discussion.--Broken and poorly preserved specimens which can be identified to genus only.

Types and occurrence.--Clatskanie well (1), Clark and Wilson well (28), Cooper Mountain well (39), Willapa River section (5).

Genus DYOCIBICIDES Cushman and Valentine, 1930

DYOCIBICIDES PERFORATA Cushman and Valentine, 1930

Dyocibicides perforata Cushman and Valentine, 1930, p. 31, pl. 30, fig. 3.--
McDougall, 1980, pl. 25, figs. 1-6.

Discussion.--The coiling pattern and coarse perforations distinguish this species. Specimens from the study area are small and frequently distorted because one side corresponds to the surface of attachment.

Types and occurrence.--USNM 262374, 262375, 262422, Clark and Wilson well (89), Cooper Mountain well (64), Wolf Creek section (59), Willapa River section (107).

Superfamily CASSIDULINACEA d'Orbigny, 1839

Family CAUCASINIDAE N. K. Bykova, 1959

Subfamily FURSENKOININAE Loeblich and Tappan, 1961

Genus FURSENKOINA Loeblich and Tappan, 1961

FURSENKOINA BRAMLETTI (Galloway and Morey, 1929)

Virgulina bramletti Galloway and Morrey, 1929, p. 37, pl. 5, fig. 14a, b.--
Sullivan, 1962, p. 275, pl. 15, figs. 1a-b, 2.--Kleinpell and Weaver,
1963, p. 176, pl. 9, fig. 5a-c.--Smith, 1971, p. 63, pl. 7, figs. 3a-b.

Discussion.--The two species of this genus present in the study area are difficult to separate, and may subsequently prove to be conspecific.

Fursenkoina bramletti is recognized by the more robust test, squarish chambers, and the shorter test. The cross section is usually oval.

Fursenkoina hobsoni has a narrow, compressed test. The chambers and the test are elongated along the axis of growth.

Types and occurrence.--Clatskanie well (46), Clark and Wilson well (84), Cooper Mountain well (79), Wolf Creek section (85), Castor Creek section (7), Rock Creek section (70), Willapa River section (17).

FURSENKOINA HOBSONI (Beck, 1943)

Virgulina hobsoni Beck, 1943, p. 606, pl. 107, figs. 6, 10.--Weaver and
Molander, 1964, p. 191, pl. 9, fig. 7.

Discussion.--See comments under Fursenkoina bramletti.

Types and occurrence.--Clatskanie well (39), Clark and Wilson well (74), Wolf Creek section (107), Castor Creek section (20), Rock Creek section (106), Willapa River section (42).

Subfamily CAUCASININAE N. K. Bykova, 1959

Genus CAUCASINA Khalilov, 1951

CAUCASINA EOCAENICA KAMCHATICA Serova, 1976

Caucasina eocaenica Khalilov kamchatica Serova, 1976, p. 324, pl. 1, figs. 1-4.

Discussion.--This species is distinguished by the biserial terminal chambers and the elongated test.

Types and occurrence.--Cooper Mountain well (59).

CAUCASINA SCHENCKI (Beck, 1943)

Bulimina schencki Beck, 1943, p. 605, pl. 107, figs. 28, 33.--Drugg, 1958, p. 98-99, pl. 5, figs. 20-21.--Mallory, 1959, p. 196, pl. 16, fig. 15.--Lindquist, 1961, p. 105, pl. 6, fig. 12a-b.--Weaver and Molander, 1964, p. 190, pl. 8, fig. 15.--Strong, 1967, p. 78-79, pl. 3, fig. 17.--McDougall, 1972, p. 120, pl. 3, fig. 15.

Bulimina cf. B. schencki Beck.--Bagley, 1959, p. 82.

Caucasina schencki (Beck).--McDougall, 1980, pl. 25, figs. 7-10.

Discussion.--This species is placed in the genus Caucasina because of the initial discorbine coil which has 4 chambers per whorl. The test later becomes triserial. Caucasina schencki differs from Caucasina schwageri (Yokoyama) in being shorter and remaining distinctly triserial. Many of the specimens do elongate slightly.

Types and occurrence.--USNM 262376, 262377, Clatskanie well (77), Clark and Wilson well (12), Cooper Mountain well (26), Wolf Creek section (72), Castor Creek section (3), Rock Creek section (149), Willapa River section (116).

Family CASSIDULINIDAE d'Orbigny, 1839

Genus CASSIDULINA d'Orbigny, 1826

CASSIDULINA GALVINENSIS Cushman and Frizzell, 1940

Cassidulina galvinensis Cushman and Frizzell, 1940, p. 43, pl. 8, fig. 10.--
Rau, 1948, p. 173, pl. 31, figs. 9, 10, 11.--Rau, 1951, p. 449, pl. 67,
fig. 6.--Loney, 1951, p. 81, pl. IX, fig. 4.--Smith, 1956, p. 99, pl. 13,
fig. 11a-c.--Mumby, 1959, p. 102, pl. 6, fig. 11.--McWilliams, 1965, p.
109-110, pl. 5, fig. 24.--Strong, 1967, p. 95, pl. 4, figs. 13-14.--
McDougall, 1980, pl. 26, figs. 1, 2.

Discussion.--The chambers in side view are roughly rectangular and at right angles to the preceding one. The periphery has a small keel and is lobate.

Types and occurrence.--USNM 262378, Cooper Mountain well (71), Willapa River section (135).

?CASSIDULINA PULCHELLA d'Orbigny, 1839

Discussion.--The specimen assigned to this species is poorly preserved. Five semirounded chambers are present in the final whorl. The ends of the chambers are directed toward the center and make an acute angle with the following one.

Types and occurrence.--Cooper Mountain well (76).

Genus GLOBOCASSIDULINA Voloshinova, 1960

GLOBOCASSIDULINA GLOBOSA (Hantken, 1875)

Cassidulina globosa Hantken, 1875, p. 64, pl. 16, fig. 2a-b.--Beck, 1943, p. 609, pl. 108, figs. 7, 13, 14.--Rau, 1951, p. 449, pl. 67, figs. 3-5.--Loney, 1951, p. 81, pl. X, fig. 7.--Wilson, 1954, p. 143, pl. 17, fig. 1a-b.--Smith, 1956, p. 100, pl. 14, fig. 2a-c.--Smith, 1957, p. 187, pl. 28, fig. 13 a, b.--Drugg, 1958, p. 122, pl. 8, figs. 25-27, 32-34.--Bagley, 1959, p. 95-96.--Carroll, 1959, p. 79.--Mumby, 1959, p. 103, pl. 6, fig. 12a-b.--Hornaday, 1961, p. 193, pl. 10, fig. 3a-c.--Sullivan, 1962, p. 283, pl. 20, fig. 5a, b.--Weaver, 1962, p. 385, pl. 7, fig. 1a-b.--Weaver and Weaver, 1962, p. 38, pl. 16, fig. 2.--Kleinpell and Weaver, 1963, p. 180, pl. 13, fig. 5a, b.--Weaver and Molander, 1964, p. 195, pl. 13, fig. 4a-b.--DeLise, 1967, p. 39, pl. 5, figs. 3a-c.--Strong, 1967, p. 93.--McDougall, 1972, p. 163.--McDougall, 1980, pl. 26, fig. 3.

Cassidulina sp.? Cushman and Schenck, 1928, p. 314, pl. 45, fig. 2.

Globocassidulina globosa (Hantken).--Fairchild and others, 1969, p. 69, pl. 22, fig. 15.--Smith, 1971, p. 63, pl. 9, fig. 5a, b.--Tipton and others, 1973, p. 62.--McDougall, 1980, pl. 26, fig. 3.

Discussion.--Specimens assigned to this species have a small, globose, finely perforate test. The periphery is broadly round. Four pairs of chambers are present in the last whorl. Sutures are flush with surface. The aperture is a comma-shaped opening on the last chamber and in line with the periphery.

Types and occurrence.--USNM 262379, Clatskanie well (24), Clark and Wilson well (15), Cooper Mountain well (12), Wolf Creek section (6), Castor Creek section (5), Rock Creek section (16), Willapa River section (6).

Family NONIONIDAE Schultze, 1854

Subfamily CHILOSTOMELLINAE Brady, 1881

Genus CHILOSTOMELLA Reuss, 1849

CHILOSTOMELLA CYLINDROIDES Reuss, 1851

Chilostomella cylindroides Reuss, 1851, p. 80, pl. 6, fig. 43.--Cushman, 1926, p. 76, pl. 11, figs. 14a-c, 15a-d.--Hornaday, 1961, p. 194, pl. 11, fig. 6a-b.--Weaver and Molander, 1964, p. 195, pl. 13, fig. 8a-b.--McDougall, 1980, pl. 26, figs. 4, 5.

Discussion.--These small specimens are most frequently recognized from pyrite molds. The calcareous test is never complete.

Types and occurrence.--USNM 262380, Wolf Creek section (105), Rock Creek section (6), Willapa River section (14).

CHILOSTOMELLA OOLINA Schwager, 1878

Chilostomella oolina Schwager, 1878, p. 513, pl. 1, fig. 16.

Discussion.--Small specimens are only represented by pyrite molds.

Types and occurrence.--Willapa River section (96).

Genus ALLOMORPHINA Reuss, 1849

ALLOMORPHINA TRIGONA Reuss, 1850

Allomorphina trigona Reuss, 1850, p. 380, pl. 48, fig. 14.--McDougall, 1980, pl. 28, figs. 6, 7.

Discussion.--The test is large and egg-shaped with the broadest part near the aperture. As in Chilostomella cylindroides these specimens are usually pyritized and little original shell remains.

Types and occurrence.--USNM 262381, Rock Creek section (1), Willapa River section (56).

Genus NONION De Montfort, 1808

NONION HALKYARDI Cushman, 1926

Nonion halkyardi Cushman, 1936, p. 63, pl. 12, fig. 1.--Carroll, 1959, pl. 60, pl. 1, fig. 13a-b.--Lindquist, 1961, p. 92, pl. 4, fig. 4a-b.--McDougall, 1980, pl. 26, figs. 8, 9.

Discussion.--The holotype examined at the U.S. National Museum has a compressed test. The sutures are broad and connect to a ring of imperforate calcareous material which surrounds the umbo region.

Specimens from the study area had to exhibit these characteristics to be assigned to this species. Several specimens assigned to Nonion planatum may actually be transition between N. halkyardi and N. planatum.

Types and occurrence.--USNM 262382, Rock Creek section (29).

NONION PLANATUM Cushman and Thomas, 1930

Nonion planatum Cushman and Thomas, 1930, p. 37, pl. 3, fig. 5.--Cushman and Dusenbury, 1934, p. 60, pl. 8, fig. 6a-b.--Beck, 1943, p. 603, pl. 107, figs. 12-13.--Loney, 1951, p. 75, pl. X, fig. 6.--Drugg, 1955, p. 86, pl. 4, figs. 6-9.--Carroll, 1959, p. 61.--Mallory, 1959, p. 181-182, pl. 15, fig. 2a-b.--Lindquist, 1961, p. 93, pl. 4, fig. 6a-b.--Kleinpell and

Weaver, 1963, p. 173, pl. 8, fig. 3a-b.--Strain, 1964, p. 74, pl. 3, figs. 2-3.--Strong, 1967, p. 69, pl. 2, figs. 39-40.

Discussion.--The holotype of this species has a compressed test, narrow sutures and no ornamentation in the umbilical region. Specimens from the study area are not as compressed as the type. This group not only contains species which are gradational to N. halkyardi but also forms which are transitional to the Melonis sp. of this study.

Types and occurrence.--Clatskanie well (15), Clark and Wilson well (59), Cooper Mountain well (19), Wolf Creek section (46), Rock Creek section (52), Willapa River section (35).

?NONION sp.

Discussion.--This specimen is broken and poorly preserved.

Types and occurrence.--Castor Creek section (45).

Genus NONIONELLA Cushman, 1926

NONIONELLA cf. N. COSTIFERA (Cushman, 1926)

Discussion.--This siliceous, partially crushed specimen has most of the characteristics of the species Nonionella costiferum. Five chambers are present in the final whorl.

Types and occurrence.--Cooper Mountain well (73).

NONIONELLA JACKSONENSIS Cushman, 1933

Nonionella jacksonensis Cushman, 1933, p. 10, pl. 1, fig. 23.

Discussion.--This species is inflated with a broadly round periphery. There is a small but definite umbilical extension of the final chamber. These forms are usually pyritized.

Types and occurrence.--Willapa River section (62).

NONIONELLA LABRADORICA (Dawson, 1860)

Nonionina labradorica Dawson, 1860, p. 191, fig. 4.

Discussion.--This species is distinguished by the large umbilical boss and the overhang of the last chamber. The test rapidly enlarges and is inflated but not as much as in other species of this genus. Pyrite frequently fills the test.

Types and occurrence.--Willapa River section (155).

NONIONELLA sp.

Discussion.--Pyritized and partially crushed specimen which could be either of the preceding species.

Types and occurrence.--Cooper Mountain well (74).

Genus NONIONELLINA Voloshinova, 1958

NONIONELLINA APPLINI (Howe and Wallace, 1932)

Nonion applini Howe and Wallace, 1932, p. 51, pl. 9, fig. 4.--Smith, 1957, p. 171, pl. 23, fig. 20a-b.

Nonionellina applini (Howe and Wallace).--McDougall, 1980, pl. 26, figs. 10-13.

Discussion.--This species was originally described as a Nonion, however, specimens usually develop characters which suggest assignment to the genus Nonionellina Voloshinova. Loeblich and Tappan (1964) note this genus is like Nonionella in juvenile stages and like Nonion in the adult stage. Specimens from the study area have chambers which increase rapidly in size, a test which is slightly asymmetrical, an umbilical region which contains granular skeletal material and no umbilical chamber extension.

Types and occurrence.--USNM 262383, 262284, Eugene section (3), Clatskanie well (7), Clark and Wilson well (41), Cooper Mountain well (41), Wolf Creek section (18), Castor Creek section (11), Rock Creek section (53), Willapa River section (29).

Genus PULLENIA Parker and Jones, 1862

PULLENIA BULLOIDES (d'Orbigny, 1846)

Nonionina bulloides d'Orbigny, 1846, p. 107, pl. 5, figs. 9-10.

Pullenia bulloides (d'Orbigny).--Kleinpell, 1938, p. 338, pl. 5, fig. 13.--
Carlson, 1969, p. 19.--McDougall, 1972, p. 170.

Discussion.--A single specimen represents this species. The test is small and nearly spherical. There are five chambers (4 1/2) with only very slightly depressed sutures. This specimen has a smaller apertural opening than normal but is still within an acceptable range.

Types and occurrence.--Willapa River section (161).

PULLENIA SALISBURYI Stewart and Stewart, 1930

Pullenia salisburyi R. E. Stewart and K. C. Stewart, 1930, p. 72, pl. 8, fig. 2.--Rau, 1951, p. 450, pl. 67, fig. 9, 10.--Smith, 1957, p. 188, pl. 28, fig. 11a-b.--Drugg, 1958, p. 124, pl. 8, figs. 30-31.--Bagley, 1959, p. 98.--Carroll, 1959, p. 81.--Mumby, 1959, p. 104, pl. 6, fig. 16a-b.--Hamlin, 1962, p. 89, pl. 8, fig. 5.--Kleinpell and Weaver, 1963, p. 180, pl. 13, figs. 6a-b.--Strain, 1964, p. 87, pl. 5, fig. 7-8.--Smith, 1971, p. 65, pl. 10, figs. 6a-b.--Tipton and others, 1973, p. 62, pl. 11, fig. 4a-b.--McDougall, 1980, pl. 27, fig. 4.

Discussion.--This species is recognized by the compressed test and six chambers in the final whorl.

Types and occurrence.--USNM 262386, Clatskanie well (51), Clark and Wilson well (32), Cooper Mountain well (23), Wolf Creek section (21), Castor Creek section (46), Rock Creek section (36), Willapa River section (47).

Family ALABAMINIDAE Hofker, 1951

Genus ALABAMINA Toulmin, 1941

ALABAMINA KERNENSIS Smith, 1956

Alabamina kernensis Smith, 1956, p. 99, pl. 15, figs. 3a-c, 4a-c.--Carroll, 1959, p. 77, pl. 3, figs. 6a-b, 7a-c.--Kleinpell and Weaver, 1963, p. 180, pl. 13, fig. 1a-c.--McDougall, 1972, p. 172.--Tipton and others, 1973, p. 61, pl. 10, fig. 5a-c.--McDougall, 1980, pl. 27, figs. 1-3.

Discussion.--This is a common species in this section and most easily recognized by the straight, tangential sutures on the ventral side and the aperture characters as in the type description.

Types and occurrence.--USNM 262385, 262423, Clark and Wilson well (30), Wolf Ceeek section (26), Castor Creek section (1), Rock Creek section (143), Willapa River section (1).

Genus GYROIDINA d'Orbigny, 1826

GYROIDINA CONDONI (Cushman and Schenck, 1928)

Eponides condoni Cushman and Schenck, 1928, p. 313, pl. 44, fig. 6, 7a-c.

Gyroidina condoni (Cushman and Schenck).--Wilson, 1954, p. 142, pl. 16, fig. 10a-c.--Smith, 1956, p. 97, pl. 14, figs. 6a-c, 7a-c.--Carroll, 1959, p. 74.--Mumby, 1959, p. 96, pl. 6, fig. 2a-c.--Hornaday, 1961, p. 192, pl. 9, fig. 5a-c.--Sullivan, 1962, p. 280, pl. 18, fig. 2a-c.--Weaver, 1962, p. 383, pl. 6, fig. 1a-c.--Kleinpell and Weaver, 1963, p. 179, pl. 11, fig. 3a-c.--Weaver and Molander, 1964, p. 193, pl. 11, fig. 4a-c.--DeLise, 1967, p. 38, pl. 4, figs. 2a-c.--Fairchild and others, 1969, p. 73, pl. 23, fig. 11a-c.--Tipton and others, 1973, p. 60, pl. 9, fig. 1a-c.--McDougall, 1980, pl. 27, fig. 5.

Discussion.--Specimens of Gyroidina condoni are small with numerous chambers and a small depressed umbo.

Types and occurrence.--USNM 262387, Clatskanie well (43), Clark and Wilson well (38), Cooper Mountain well (13), Wolf Creek section (61), Rock Creek section (17), Willapa River section (7).

GYROIDINA ORBICULARIS PLANATA Cushman, 1935

Gyroidina orbicularis d'Orbigny planata Cushman, 1935, p. 45, pl. 18, fig. 3.--Rau, 1948, p. 171, pl. 31, figs. 12, 13, 14.--Rau, 1951, p. 447, pl. 66, figs. 4-6.--Sullivan, 1962, p. 280, pl. 18, fig. 1a-c.--Tipton and others, 1973, p. 60, pl. 9, fig. 2a-c.--McDougall, 1980, pl. 27, figs. 7-9.

Discussion.--Specimens assigned to this species are distinguished by flat dorsal side and strongly convex ventral side.

Types and occurrence.--USNM 262389, Cooper Mountain well (28), Wolf Creek section (91), Rock Creek section (164), Willapa River section (60).

GYROIDINA SOLDANII d'Orbigny, 1826

Gyroidina soldanii d'Orbigny, 1826, p. 278.--d'Orbigny, 1846, pl. 8, figs. 10-12.--Cushman and Parker, 1931, p. 11, pl. 2, fig. 9a-b.--Smith, 1956, p. 98, pl. 14, fig. 5a-c.--Hamlin, 1962, p. 83, pl. 6, fig. 7.--McDougall, 1972, p. 176.--McDougall, 1980, pl. 27, figs. 6, 10-12.

Discussion.--Specimens assigned to this species are unequally biconvex and the last whorl is raised above the preceding one.

Types and occurrence.--USNM 262388, Clatskanie well (76), Clark and Wilson well (31), Cooper Mountain well (29), Wolf Creek section (23), Castor Creek section (21), Rock Creek section (83), Willapa River section (43).

GYROIDINA SOLDANII d'Orbigny OCTOCAMERATA

Cushman and G D. Hanna, 1927

Gyroidina soldanii d'Orbigny var. octocamerata Cushman and Hanna, 1927, p. 223, pl. 14, figs. 16-18.--Cushman and Schenck, 1928, p. 312, pl. 44, figs. 3-5.--McDougall, 1980, pl. 30, figs. 1-3.

Discussion.--Specimens assigned to this species are recognized by the eight chambers but otherwise having the same characteristics as Gyroidina soldanii.

Types and occurrence.--USNM 262390, Rock Creek section (71).

GYROIDINA spp.

Discussion.--Broken, crushed or poorly preserved fragments which probably belong to this genus.

Types and occurrence.--Clark and Wilson well (93), Cooper Mountain well (77), Rock Creek section (84).

Genus ORIDORSALIS Anderson, 1961

ORIDORSALIS UMBONATUS (Reuss, 1851)

Rotalina umbonata Reuss, 1851, p. 75, pl. 5, fig. 35.

Eponides umbonata (Reuss).--Smith, 1957, p. 183, pl. 27, figs. 12a-c, 14a-c.--Drugg, 1958, p. 118, pl. 7, figs. 37-39.--Bagley, 1959, p. 92.--Carroll, 1959, p. 76.--Mallory, 1959, p. 239, pl. 30, fig. 3a-c, pl. 37, fig. 11a-c.--Mumby, 1959, p. 100, pl. 6, fig. 8a-c.--Thoms, 1959, p. 80, pl. 4, fig. 9a-c.--Lindquist, 1961, p. 117, pl. 8, fig. 9a-c.--Weaver and Weaver, 1962, p. 37, pl. 14, figs. 2a-c, 3a-c.--Strain, 1964, p. 85.--Smith, 1971, p. 61, pl. 9, figs. 3a-c.--McDougall, 1972, p. 144.

Eponides umbonatus (Reuss).--Loney, 1951, p. 80, pl. IX, fig. 4.--Rau, 1951, p. 448, pl. 66, figs. 1-5.--Hamlin, 1962, p. 84, pl. 7, fig. 3.--Sullivan, 1962, p. 281, pl. 18, figs. 7a-c, 8a-c.--Kleinpell and Weaver, 1963, p. 179, pl. 12, fig. 3a-c.--Strong, 1967, p. 91, pl. 4, figs. 1-3.--Carlson, 1969, p. 15.

Oridorsalis umbonatus (Reuss).--McDougall, 1980, pl. 28, figs. 4-6.

Discussion.--Small species which are common in the Willapa River section and easily recognized by the "S" shaped sutures on the umbilical side and straight perpendicular sutures on the spiral side.

Types and occurrence.--USNM 262391, Wolf Creek section (111), Rock Creek section (170), Willapa River section (77).

ORIDORSALIS cf. O. UMBONATUS (Reuss, 1851)

Discussion.--Poorly preserved specimens which exhibit most of the characteristics of this species.

Types and occurrence.--Cooper Mountain Well (20).

Family ANOMALINIDAE Cushman, 1927

Subfamily ANOMALININAE Cushman, 1927

Genus ANOMALINA d'Orbigny, 1826

ANOMALINA CALIFORNIENSIS Cushman and Hobson, 1935

Anomalina californiensis Cushman and Hobson, 1935, p. 64, pl. 9, fig. 8.--
Smith, 1956, p. 100, pl. 16, fig. 3a-c.--Smith, 1971, p. 67, pl. 11,
figs. 5a-c.--McDougall, 1980, pl. 28, figs. 7-9, pl. 29, figs. 1-3.

Discussion.--Although similar to the Nonion and Melonis species of this study, this species can be recognized by the distinctly evolute coiling.

Types and occurrence.--USNM 262392, 262393, Wolf Creek section (27), Rock Creek section (159), Willapa River section (91).

?ANOMALINA sp.

Discussion.--This is a poorly preserved specimen which can only be questionably assigned to this genus.

Types and occurrence.--Clatskanie Well (45).

Genus BOLDIA Van Bellen, 1946

BOLDIA HODGEI (Cushman and Schenck, 1928)

Cibicides hodgei Cushman and Schenck, 1928, p. 315, pl. 45, figs. 3, 4, 5.--
Rau, 1951, p. 451, pl. 67, figs. 28-30.--Smith, 1956, p. 101, pl. 16,
fig. 1a-c.--Bagley, 1959, p. 101, pl. 6, figs. 22-24.--Mallory, 1959, p.
265, pl. 24, figs. 6a-b.--Hornaday, 1961, p. 194, pl. 13, fig. 1a-c.--
Hamlin, 1962, p. 92, pl. 9, fig. 2.--Sullivan, 1962, p. 286, pl. 23, fig.
8a-c.--Kleinpell and Weaver, 1963, p. 182, pl. 15, fig. 2a-c.--Weaver and
Molander, 1964, p. 199, pl. 17, fig. 6a-c.--McWilliams, 1965, p. 113-114,
pl. 5, figs. 17-18.--Fairchild and others, 1969, p. 65, pl. 19, fig. 5a-
c.

Cibicidina hodgei (Cushman and Schenck).--McDougall, 1972, p. 148.

Cibicides cushmani Nuttall, 1930, p. 291, pl. 25, figs. 3, 5, 6.--Sullivan,
1962, p. 287, pl. 23, fig. 7a-c.

Boldia hodgei (Cushman and Schenck).--McDougall, 1980, pl. 29, figs. 4-6.

Discussion.--The descriptions of C. hodgei and C. cushmani are identical except for the size and numbers of chambers in the final whorl. Specimens' from the study area represent the holotype morphology and transitional forms, therefore these species are considered conspecific, with C. hodgei as the senior synonym.

The species is placed in the genus Boldia because of the raised sutures. Many of the smaller specimens have flush or slightly depressed sutures.

Types and occurrence.--USNM 262394, Clatskanie well (73), Clark and Wilson well (26), Cooper Mountain well (2), Wolf Creek section (1), Castor Creek section (18), Rock Creek section (7), Willapa River section (4).

BOLDIA cf. B. HODGEI (Cushman and Schenck, 1928)

Discussion.--These are poorly preserved specimens which resemble this species.

Types and occurrence.--Wolf Creek section (55).

Genus MELONIS De Montfort, 1808

Nonion umbilicatus (Montagu).--Cushman and Schenck, 1928, p. 310, pl. 44, figs. 2a, b.

Melonis sp.--McDougall, 1980, pl. 29, figs. 7-9.

Discussion.--Cushman and Schenck (1928) describe specimens which they have assigned to the species Melonis pompilioides. The specific designation by Cushman and Schenck (1928) is incorrect because Melonis umbilicatus (Montagu) illustrated by Walker and Jacob in 1798 (see Ellis and Messina under Nautilus umbilicatus Walker and Jacob) and types in the U.S. National Museum are all compressed forms.

Light microscopic examination indicates that these specimens from the Oregon study area are close if not identical to Melonis pompilioides (Fichtel and Moll). Scanning electron microscope examination shows that these species are not Melonis pompilioides nor the shallow water homeomorph, Melonis soldanii (d'Orbigny). According to Frerichs (1969) these two species differ in pore size, sutural relief, and umbilical-sutural relationships. The Melonis sp. of this study has larger and fewer pores than M. soldanii but not as large or as numerous as in M. pompilioides. The sutures in the late Eocene specimens radiate from the umbo like M. pompilioides; however, the sutures are not as well defined as in M. pompilioides. Frerichs has examined some of these specimens and confirms that these are not M. pompilioides but are very close.

These specimens should be named because they constitute a biostratigraphically and ecologically important group. Naming will be postponed, however, until some of the species from the Japanese and Russian late Eocene strata can be considered and thus avoid unnecessary duplication.

Types and occurrence.--USNM 262395, Wolf Creek section (17), Rock Creek section (122), Willapa River section (106).

Superfamily ROBERTINACEA Reuss, 1850

Family CERATOBULIMINIDAE Cushman, 1927

Subfamily CERATOBULIMININAE Cushman, 1927

Genus CERATOBULIMINA Toulà, 1915

CERATOBULIMINA WASHBURNEI Cushman and Schenck, 1928

Ceratobulimina washburnei Cushman and Schenck, 1928, p. 314, pl. 45, figs. 1a-c.--Rau, 1948, p. 172, pl. 31, figs. 15, 16, 17.--McDougall, 1980, pl. 29, figs. 10, 11.

Discussion.--This species is similar and may prove to be conspecific with Ceratobulimina alazaensis Cushman and Harris, 1927. Examination of types in the U.S. National Museum indicates that there is a slight difference in the aperture. The base of the aperture rests on the preceding whorl in C. alazaensis but is open to the umbilicus in C. washburnei. In the type illustrations of C. alazaensis, the aperture is more like C. washburnei. Intermediary forms may be found.

Types and occurrence.--USNM 262396, Clatskanie well (36), Clark and Wilson well (48), Cooper Mountain well (4), Wolf Creek section (28), Rock Creek section (112), Willapa River section (142).

Subfamily EPISTOMININAE Wedekind, 1937

Genus HOEGLUNDINA Brotzen, 1948

HOEGLUNDINA EOCENICA (Cushman and Hanna, 1927)

Epistomina eocenica Cushman and Hanna, 1927, p. 53, pl. 5, figs. 4-5.--Rau, 1948, p. 172, pl. 31, figs. 1, 2, 3.

Discussion.--The aragonite wall has a distinctly different appearance from the hyaline wall, making this specimen easy to identify. The test diameter of Hoeglundina eocenica specimens increases with depth (Table 3). The outer neritic forms (Wolf Creek section) have an average diameter of 0.34 mm, this increases to 0.41 mm in the upper bathyal (Rock Creek section) and 0.46 mm in the middle bathyal (Willapa River section).

Types and occurrence.--Wolf Creek section (103), Rock Creek section (119), Willapa River section (97).

Table 3. Diameter measurements of Hoeglundina eocenica (Cushman and Bermudez).

Section	Sample	Diameter	Number of specimens
Wolf Creek	B0060	0.36	2
		0.28	2
	B0062	0.58	1
		0.50	1
		0.40	2
		0.38	1
		0.36	1
		0.34	2
		0.32	1
		0.30	4
		0.28	1
		0.26	3
	0.24	3	
	B0063	0.48	1
		0.44	1
		0.40	1
	B0066	0.46	1
		0.44	1
		0.40	1
		0.34	1
0.32		2	
	0.30	2	

Table 3. Diameter measurements of Hoeglundina eocenica (Cushman and Bermudez)--continued.

Section	Sample	Diameter	Number of specimens
Wolf Creek	B0066	0.28	1
		0.20	1
	B0067	0.44	2
		0.30	1
	B0068	0.46	1
	KAM 105	0.40	1
	UOC 13-1	0.30	1
	UOC 13-2	0.30	1
	UOC 13-3	0.54	1
		0.40	2
		0.30	1
	UOC 13-4	0.28	1
		0.36	1
		0.40	1
		?	1
Rock Creek	KAM 1017	0.42	1
	KAM 1019	0.34	1
	KAM 1020	0.40	1
		0.36	1
		0.32	1

Table 3. Diameter measurements of Hoeglundina eocenica (Cushman and Bermudez)--continued.

Section	Sample	Diameter	Number of specimens
Rock Creek	KAM 1022	0.24	1
		0.20	1
	KAM 1029	?	1
	KAM 1041	0.80	1
	KAM 234	0.70 ^{c'}	1
		0.68 ^{c'}	1
		0.60	2
		0.44	1
		0.42	1
		0.36	2
Willapa River	76-11	0.40	1
		0.48	1
	76-12	0.40	1
		0.56	1
	101-5	0.40	1
	101-9	0.42	1
	106-4	0.60	1
		0.44	1

c'/ crushed specimen

Family ROBERTINIDAE Reuss, 1850

Genus ROBERTINA d'Orbigny, 1846

ROBERTINA WASHINGTONENSIS Beck, 1943

Robertina washingtonensis Beck, 1943, p. 604, pl. 107, figs. 17, 19, 24.--
McDougall, 1980, pl. 29, fig. 12.

Discussion.--These specimens are rare but easily recognized by the wall structure and the coiled test.

Types and occurrence.--USNM 262397, Clatskanie well (58), Clark and Wilson well (21), Cooper Mountain well (66), Wolf Creek section (114), Castor Creek section (47), Rock Creek section (146).

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Appendix 1. Faunal distribution chart, Eugene section.

	Sample	KAM 202	KAM 203
Benthic Foraminifera			
1. <u>Elphidium californicum</u> Cook -----		F	A
2. <u>Lenticulina inornata</u> (d'Orbigny) -----		F	F
3. <u>Nonionellina applini</u> (Howe and Wallace) --		F	F
4. <u>Bolivina kleinpelli</u> Beck -----		-	C
5. <u>Elphidium minutum</u> (Reuss) -----		-	C
6. <u>Eponides mexicanus</u> (Cushman) -----		-	F
7. <u>Guttulina irregularis</u> (d'Orbigny) -----		-	F
8. <u>Globobulimina pacifica</u> Cushman -----		-	F
9. <u>Lagena semistriata</u> Williamson -----		-	R
10. <u>Pseudonodosaria inflata</u> (Costa) -----		-	F
11. <u>Uvigerina cocoaensis</u> species group -----		-	F
Associated organisms			
12. Radiolarians -----		?	?
13. Diatoms -----		R	-
14. Sponge spicules -----		-	R
15. Geodites -----		-	F

Appendix 4.--Fauna] distribution chart, Cooper Mountain well--continued.

Part 5B

	1986	1984	1980	1440	1438	1436	1430	1381	1375	1373	1371	1369	1367	1127	1125+	1114	1110	1098	1082-92
60. <u>Guttulina hantkeni</u> Cushman and Ozawa -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61. <u>Guttulina problema</u> d'Orbigny -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62. <u>Lagena hexagona</u> (Williamson) -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63. <u>Lenticulina budensis</u> (Hantken) -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64. <u>Dyocibicides perforata</u> Cushman and Valentine -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65. <u>Karrieriella washingtonensis</u> Rau -----	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66. <u>Robertina washingtonensis</u> Beck -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67. <u>Lenticulina crassa</u> (d'Orbigny) -----	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68. <u>Buccella mansfieldi oregonensis</u> (Cushman, Stewart and Stewart) -----	-	-	-	-	-	-	F	-	-	-	-	-	-	-	F	-	-	-	-
69. <u>Quinqueloculina</u> spp. -----	-	-	-	-	-	-	-	R	R	-	-	-	-	-	-	-	-	-	-
70. <u>Buliminella bassendorffensis</u> Cushman and Parker -----	-	-	-	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-	-
71. <u>Cassidulina galvinensis</u> Cushman and Frizzell -----	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-
72. ? <u>Eponides</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73. <u>Nonionella</u> cf. <u>N. costifera</u> (Cushman) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-
74. <u>Nonionella</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-

Appendix 4.--Faunal distribution chart, Cooper Mountain well--continued.

Part 6B

	1986	1984	1980	1440	1438	1436	1430	1381	1375	1373	1371	1369	1367	1127	1125+	1114	1110	1098	1082-92
75. <u>Bolivina marginata</u> Cushman -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-
76. <u>Cassidulina pulchella</u> d'Orbigny -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-
77. <u>Gyroidina</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-
78. <u>Eponides</u> cf. <u>E. mexicanus</u> Cushman -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-
79. <u>Fursenkoia bramletti</u> (Galloway and Morrey) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-
PLANKTIC FORAMINIFERS																			
80. <u>Globigerina</u> cf. <u>G. tripartita</u> Koch -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81. <u>Globorotaloides</u> aff. <u>G. suteri</u> Bollf -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82. <u>Globigerina</u> spp. -----	-	-	-	R	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
83. <u>Pseudohastigerina micra</u> (Cole) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ASSOCIATED ORGANISMS																			
84. Echinoid spines -----	F	F	-	-	F	R	F	-	-	-	-	-	-	-	-	-	-	-	-
85. Megafossil fragments -----	-	F	R	F	F	F	-	F	F	-	F	F	-	-	-	F	F	-	-
86. Radiolarians -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-
87. Ostracods -----	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
88. Diatoms -----	-	-	-	-	R	F	-	R	R	R	-	-	F	-	F	F	F	R	-

Appendix 4.--Faunal distribution chart, Cooper Mountain well--continued.

Part 7B

Sample No.	89. Fish debris	90. Geodites	91. Siliceous molds
1986	.	.	.
1984	.	.	.
1980	.	.	.
1440	.	.	.
1438	.	.	.
1436	.	.	.
1430	.	.	.
1381	.	.	.
1375	.	.	.
1373	.	.	F
1371	.	.	F
1369	.	.	F
1367	.	.	.
1127	.	.	.
1125+	.	.	.
1114	.	.	F
1110	.	.	R
1098	.	.	R
1082-92	.	.	F

Appendix 5.---Faunal distribution chart, Wolf Creek section--continued.

Part 4A

45. <u>Marginulina</u> spp. -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	R	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	-	KAM267B	-	KAM267C	-	KAM267D	F	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
46. <u>Nonion planatum</u> Cushman and Thomas -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	F	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	R	KAM267B	F	KAM267C	F	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	R	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
47. <u>Stilostomella lepidula</u> (Schwager) -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	F	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	F	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
48. ? <u>Uvigerina</u> sp. -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	R	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	-	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
49. <u>Ammodiscus incertus</u> (d'Orbigny) -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	F	UOC 2-3	-	UOC 2-4	-	KAM267A	F	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	R	UOC 3-3	F	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	F	UOC 4-4	-	UOC 4-5	-	UOC 5-1	F	UOC 6-1	-	UOC 6-2	-
50. <u>Bathysiphon</u> spp. -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	R	UOC 2-3	-	UOC 2-4	-	KAM267A	-	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	F	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
51. <u>Trochammina globigeriniformis</u> (Parker and Jones) -	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	A	UOC 2-3	C	UOC 2-4	A	KAM267A	-	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	R	UOC 3-2	F	UOC 3-3	C	UOC 3-4	F	UOC 4-1	-	UOC 4-2	C	UOC 4-3	C	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
52. <u>Bathysiphon eocenica</u> Cushman and Hanna -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	F	UOC 2-4	-	KAM267A	-	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	F	UOC 3-4	-	UOC 4-1	-	UOC 4-2	C	UOC 4-3	C	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
53. <u>Cyclamina</u> sp. -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	F	KAM267A	-	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	F	UOC 4-3	F	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
54. <u>Dorothis</u> sp. A -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	F	KAM267A	-	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
55. <u>Boldia</u> cf. <u>B. hodgei</u> Cushman and Schenck -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	R	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
56. <u>Dentalina cocoensis</u> (Cushman) -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	F	KAM267B	F	KAM267C	F	KAM267D	-	UOC 3-1	F	UOC 3-2	-	UOC 3-3	-	UOC 3-4	F	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
57. <u>Dentalina communis</u> (d'Orbigny) -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	R	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
58. <u>Dentalina duseburyi</u> Beck -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	R	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
59. <u>Dyocibicides perforata</u> Cushman and Valentine -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	F	KAM267B	F	KAM267C	R	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-
60. <u>Gaudryina alazaensis</u> Cushman -----	UOC 1-1	-	UOC 1-2	-	UOC 1-3	-	UOC 1-4	-	UOC 1-5	-	UOC 1-6	-	UOC 1-7	-	UOC 1-8	-	UOC 2-1	-	UOC 2-2	-	UOC 2-3	-	UOC 2-4	-	KAM267A	R	KAM267B	-	KAM267C	-	KAM267D	-	UOC 3-1	-	UOC 3-2	-	UOC 3-3	-	UOC 3-4	-	UOC 4-1	-	UOC 4-2	-	UOC 4-3	-	UOC 4-4	-	UOC 4-5	-	UOC 5-1	-	UOC 6-1	-	UOC 6-2	-

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 7B

92. <u>Pyralina cylindroides</u> (Roemer) -----	UC 6-3	.
	UC 6-4	.
	UC 6-5	.
	UC 6-6	.
	UC 6-7	.
	UC 6-8	.
	UC 6-9	.
	UC 6-10	.
	UC 6-11	.
	UC 6-12	.
	UC 6-13	.
	UC 6-14	.
	UC 6-15	.
	UC 7-1	.
	UC 7-2	.
	UC 7-3	.
	B0076	.
	UC 8-1	.
	UC 8-2	.
	UC 8-3	.
	UC 8-4	.
	UC 8-5	.
	UC 8-6	.
	UC 8-7	.
	UC 8-8	.
	UC 8-9	.
	UC 8-10	.
	UC 8-11	.
93. <u>Bolivina kleinpelli</u> Beck -----		.
94. <u>Quinqueloculina weaveri</u> Rau -----		.
95. <u>Bolivina jacksonensis striatella</u>		.
Cushman and Applin -----		.
96. <u>Cyclogyra byramensis</u> (Cushman) -----		.
97. <u>Discorbis</u> sp. -----		.
98. <u>Saracenaria schencki</u> Cushman and Hobson -----		.
99. <u>Textularia adalta</u> Cushman -----		.
100. <u>Praeglobbulimina</u> spp. -----		.
101. <u>Guttulina</u> cf. <u>G. hantkeni</u> Cushman and Ozawa -----		.
102. <u>Pyralina fusiformis</u> (Roemer) -----		.
103. <u>Hoeglundina eocenica</u> (Cushman and Hanna) -----		.
104. <u>Guttulina</u> cf. <u>G. orientalis</u> Cushman and Ozawa -----		.
105. <u>Chilostomella cylindroides</u> Reuss -----		.
106. <u>Bulimina</u> spp. -----		.

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 8B

107. <u>Fursenkoina hobsoni</u> Beck -----	UCC 8-3	.	UCC 8-4	.	UCC 8-5	.	UCC 8-6	.	UCC 8-7	.	UCC 8-8	.	UCC 8-9	.	UCC 8-10	.	UCC 8-11	.
108. <u>Plectofrondicularia packardii multilineata</u> Cushman and Simonson -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
109. <u>Fronicularia</u> sp. -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
110. <u>Lagena semistriata</u> Williamson -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
111. <u>Oridorsalis umbonatus</u> (Reuss) -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
112. <u>Polymorphina</u> sp. -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
113. <u>Pyrulina</u> sp. -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
114. <u>Robertina washingtonensis</u> Beck -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
115. <u>Trifarina hannai</u> Beck -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
PLANKTIC FORAMINIFERA																		
116. <u>Globigerinatheka index tropicalis</u> (Blow and Banner) -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
117. <u>?Globigerina</u> spp. -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
118. <u>?Globigerinatheka</u> sp. -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.
119. <u>?Globorotaloides</u> sp. -----	UCC 6-3	.	UCC 6-4	.	UCC 6-5	.	UCC 6-6	.	UCC 6-7	.	UCC 6-8	.	UCC 6-9	.	UCC 6-10	.	UCC 6-11	.

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 9B

120. <u>Globorotalia insolita</u> Jenkins -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
121. <u>Globigerinatheka index</u> (Finlay) -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
122. <u>Globigerina praebulloides</u> Blow -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
ASSOCIATED ORGANISMS																																																								
123. Echinoid spines -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
124. Fish debris -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
125. Radiolarians -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	F	UCC 6-6	F	UCC 6-7	F	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	F	UCC 6-15	F	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	F	UCC 8-8	F	UCC 8-9	F	UCC 8-10	F	UCC 8-11	F
126. Geodites -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
127. Ostracods -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
128. Diatoms -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	F	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	F	UCC 8-8	F	UCC 8-9	F	UCC 8-10	F	UCC 8-11	F
129. Megafossil fragments -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	-	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	-	UCC 8-8	-	UCC 8-9	-	UCC 8-10	-	UCC 8-11	-
130. Sponge spicules -----	UCC 6-3	-	UCC 6-4	-	UCC 6-5	-	UCC 6-6	-	UCC 6-7	-	UCC 6-8	-	UCC 6-9	-	UCC 6-10	-	UCC 6-11	-	UCC 6-12	-	UCC 6-13	-	UCC 6-14	-	UCC 6-15	-	UCC 7-1	F	UCC 7-2	-	UCC 7-3	-	B0076	-	UCC 8-1	-	UCC 8-2	-	UCC 8-3	-	UCC 8-4	-	UCC 8-5	-	UCC 8-6	-	UCC 8-7	F	UCC 8-8	F	UCC 8-9	F	UCC 8-10	F	UCC 8-11	F

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 1C

	UOC 8-12	UOC 8-13	UOC 8-14	UOC 8-15	UOC 8-16	UOC 8-17	UOC 8-18	UOC 8-19	UOC 8-20	B0077	UOC 9-1	UOC 9-2	UOC 9-3	UOC 9-4	UOC 9-5	UOC 9-6	UOC 9-7	UOC 9-8	UOC 9-9	B0078	UOC 10-1	UOC 10-2	UOC 10-3	B0079	UOC 11-1	UOC 11-2	UOC 11-3	UOC 11-4		
BENTHIC FORAMINIFERA																														
1. <u>Boldia hodgei</u> (Cushman and Schenck) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. <u>Cibicides elmaensis</u> Rau -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	A	C	F	C	
3. <u>Cibicides haydoni</u> (Cushman and Schenck) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	-	-	-	A	A	C	C	
4. <u>Eponides mexicanus</u> (Cushman) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	R	-	F	
5. <u>Globobulimina pacifica</u> Cushman -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	
6. <u>Globocassidulina globosa</u> (Hantken) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	F	F	C	F	
7. <u>Lenticulina crassa</u> (d'Orbigny) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
8. <u>Lenticulina</u> spp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
9. <u>Nodosaria</u> spp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	
10. <u>Pseudonodosaria inflata</u> (Costa) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	R	-	R	
11. <u>Quinqueloculina</u> spp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	
12. <u>Dentalina jacksonensis</u> Cushman and Applin -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	F	-	F	
13. <u>Guttulina irregularis</u> (d'Orbigny) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	F	F	-	F	

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 4C

45. <u>Marginulina</u> spp. -----	UOC 8-12	-	UOC 9-1	B0077	UOC 10-1	-	UOC 10-2	B0079	UOC 11-1	-	UOC 11-4	-
46. <u>Nonion planatum</u> Cushman and Thomas -----	UOC 8-13	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
47. <u>Stilostomella lepidula</u> (Schwager) -----	UOC 8-14	-	UOC 9-1	-	UOC 10-1	R	UOC 10-2	-	UOC 11-1	R	UOC 11-2	F
48. ? <u>Uvigerina</u> sp. -----	UOC 8-15	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	F
49. <u>Amodiscus incertus</u> (d'Orbigny) -----	UOC 8-16	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
50. <u>Bathysiphon</u> spp. -----	UOC 8-17	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
51. <u>Trochammina globigeriniformis</u> (Parker and Jones) -	UOC 8-18	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
52. <u>Bathysiphon eocenica</u> Cushman and Hanna -----	UOC 8-19	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
53. <u>Cyclammina</u> sp. -----	UOC 8-20	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
54. <u>Dorothia</u> sp. A -----	UOC 8-12	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
55. <u>Boldia</u> cf. <u>B. hodgei</u> Cushman and Schenck -----	UOC 8-13	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
56. <u>Dentalina cocoaensis</u> (Cushman) -----	UOC 8-14	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
57. <u>Dentalina communis</u> (d'Orbigny) -----	UOC 8-15	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
58. <u>Dentalina duseburyi</u> Beck -----	UOC 8-16	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
59. <u>Dyocibicides perforata</u> Cushman and Valentine -----	UOC 8-17	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-
60. <u>Gaudryina alazaensis</u> Cushman -----	UOC 8-18	-	UOC 9-1	-	UOC 10-1	-	UOC 10-2	-	UOC 11-1	-	UOC 11-3	-

Appendix 5.---Faunal distribution chart, Wolf Creek section--continued.

Part 5C

61. <u>Gyroidina condoni</u> (Cushman and Schenck) -----	UOC 8-12	-	UOC 9-1	B0077	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	B0078	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	B0079	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-						
62. <u>Lenticulina chehalisensis</u> (Rau) -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
63. <u>Lenticulina lincolnensis</u> (Rau) -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
64. <u>Lenticulina weaveri</u> Beck -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
65. <u>Nodosaria longiscata</u> d'Orbigny -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
66. <u>Plectofrondicularia gracilis</u> Smith -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
67. <u>Quinqueloculina goodspeedi</u> Hanna and Hanna -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
68. <u>Quinqueloculina imperialis</u> Hanna and Hanna -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
69. <u>Stilostomella adolphina</u> (d'Orbigny) -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
70. <u>Valvulineria involuta</u> Cushman and Dusenbury -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
71. <u>Valvulineria</u> cf. <u>V. menloensis</u> Rau -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
72. <u>Caucasina schencki</u> (Beck) -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
73. <u>Cibicides lobatulus</u> (Walker and Jacob) -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
74. <u>Dentalina</u> cf. <u>D. obliquisuturata</u> (Stache) -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
75. <u>Lagena costata</u> (Williamson) -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-
76. <u>Marginulina inconspicua</u> Hussey -----	UOC 8-12	-	UOC 9-1	-	UOC 9-2	-	UOC 9-3	-	UOC 9-4	-	UOC 9-5	-	UOC 9-6	-	UOC 9-7	-	UOC 9-8	-	UOC 9-9	-	UOC 9-9	-	UOC 10-1	-	UOC 10-2	-	UOC 10-3	-	UOC 10-3	-	UOC 10-2	-	UOC 10-1	-	UOC 11-1	-	UOC 11-2	-	UOC 11-3	-	UOC 11-4	-

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 8C

107. <u>Fursenkofina hobsoni</u> Beck -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
108. <u>Plectofrondicularia packardii multilineata</u> Cushman and Simonson -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
109. <u>Fronicularia</u> sp. -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
110. <u>Lagena semistriata</u> Williamson -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
111. <u>Oridorsalis umbonatus</u> (Reuss) -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
112. <u>Polymorphina</u> sp. -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
113. <u>Pyrulina</u> sp. -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
114. <u>Robertina washingtonensis</u> Beck -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
115. <u>Trifarina hannah</u> Beck -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
PLANKTIC FORAMINIFERA																																																								
116. <u>Globigerinatheka index tropicalis</u> (Blow and Banner) -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
117. <u>Globigerina</u> spp. -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
118. ? <u>Globigerinatheka</u> sp. -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.
119. ? <u>Globorotaloides</u> sp. -----	UOC 8-12	.	UOC 8-13	.	UOC 8-14	.	UOC 8-15	.	UOC 8-16	.	UOC 8-17	.	UOC 8-18	.	UOC 8-19	.	UOC 8-20	.	B0077	.	UOC 9-1	.	UOC 9-2	.	UOC 9-3	.	UOC 9-4	.	UOC 9-5	.	UOC 9-6	.	UOC 9-7	.	UOC 9-8	.	UOC 9-9	.	B0078	.	UOC 10-1	.	UOC 10-2	.	UOC 10-3	.	B0079	.	UOC 11-1	.	UOC 11-2	.	UOC 11-3	.	UOC 11-4	.

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 9C

120. <u>Globorotalia insolita</u> Jenkins -----	UC 8-12	-	UC 8-13	-	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
121. <u>Globigerinatheka index</u> (Finlay) -----	UC 8-12	-	UC 8-13	-	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
122. <u>Globigerina praebulloides</u> Blow -----	UC 8-12	-	UC 8-13	-	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
ASSOCIATED ORGANISMS																																																					
123. Echinoid spines -----	UC 8-12	-	UC 8-13	-	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
124. Fish debris -----	UC 8-12	-	UC 8-13	-	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
125. Radiolarians -----	UC 8-12	-	UC 8-13	F	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	R	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
126. Geodites -----	UC 8-12	F	UC 8-13	F	UC 8-14	F	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	R	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
127. Ostracods -----	UC 8-12	-	UC 8-13	-	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
128. Diatoms -----	UC 8-12	-	UC 8-13	F	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	R	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
129. Megafossil fragments -----	UC 8-12	-	UC 8-13	-	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	-	UC 8-19	-	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-
130. Sponge spicules -----	UC 8-12	-	UC 8-13	R	UC 8-14	-	UC 8-15	-	UC 8-16	-	UC 8-17	-	UC 8-18	R	UC 8-19	R	UC 8-20	-	B0077	UC 9-1	-	UC 9-2	-	UC 9-3	-	UC 9-4	-	UC 9-5	-	UC 9-6	-	UC 9-7	-	UC 9-8	-	UC 9-9	-	B0078	UC 10-1	-	UC 10-2	-	UC 10-3	-	B0079	UC 11-1	-	UC 11-2	-	UC 11-3	-	UC 11-4	-

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 1D

	UC 11-5	B0080	UC 12-1	UC 12-2	UC 12-3	UC 12-4	UC 12-5	UC 12-6	UC 12-7	UC 12-8	UC 12-9	UC 12-10	UC 12-11	B0081	B0060	B0061	B0062	B0063	KAM104	KAM105	KAM106	KAM107	B0064	B0065	B0066	B0067	B0068	VA 175	
BENTHIC FORAMINIFERA																													
1. <u>Boidea hodgei</u> (Cushman and Schenck) -----	-	F	R	-	-	-	-	F	C	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. <u>Cibicides elmaensis</u> Rau -----	F	A	-	F	-	A	C	A	-	F	-	F	C	F	-	C	-	F	F	A	C	A	C	C	A	-	-	-	
3. <u>Cibicides haydoni</u> (Cushman and Schenck) -----	F	A	-	F	-	C	A	A	F	C	-	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4. <u>Eponides mexicanus</u> (Cushman) -----	R	F	-	F	-	F	F	F	-	F	F	F	F	F	C	A	C	F	F	F	C	C	A	F	F	C	-	-	
5. <u>Globobulimina pacifica</u> Cushman -----	-	F	-	-	-	-	-	F	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6. <u>Globocassidulina globosa</u> (Hantken) -----	F	A	-	F	-	A	-	F	-	-	C	-	F	-	C	-	F	-	F	F	-	-	A	A	F	-	-		
7. <u>Lenticulina crassa</u> (d'Orbigny) -----	-	-	-	R	-	-	-	R	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
8. <u>Lenticulina</u> spp. -----	-	-	-	-	-	-	-	-	-	-	F	F	-	-	F	-	-	F	F	-	F	-	-	F	C	F	-	-	
9. <u>Nodosaria</u> spp. -----	-	-	-	-	-	-	-	R	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10. <u>Pseudonodosaria inflata</u> (Costa) -----	F	C	-	F	-	R	-	F	-	-	R	-	F	-	F	-	-	-	-	-	-	-	R	-	-	-	-	-	
11. <u>Quinqueloculina</u> spp. -----	-	-	-	-	-	-	-	-	-	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12. <u>Dentalina jacksonensis</u> Cushman and Applin -----	-	F	-	-	-	-	-	-	F	C	-	F	-	-	R	F	-	F	-	F	F	-	F	F	-	F	F	-	
13. <u>Guttulina irregularis</u> (d'Orbigny) -----	-	F	-	-	-	-	-	-	F	-	F	-	F	-	F	-	-	F	-	F	F	-	F	F	F	F	F	F	C

Appendix 5.--Faunal distribution chart, Wolf Creek section--continued.

Part 2D

	UOC 11-5	B0080	UOC 12-1	UOC 12-2	UOC 12-3	UOC 12-4	UOC 12-5	UOC 12-6	UOC 12-7	UOC 12-8	UOC 12-9	UOC 12-10	UOC 12-11	B0081	B0060	B0061	B0062	B0063	KAM104	KAM105	KAM106	KAM107	B0064	B0065	B0066	B0067	B0068	VA 175
14. <u>Haplophragmoides</u> spp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15. <u>Karrerietta washingtonensis</u> Rau -----	-	F	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16. <u>Lenticulina inornata</u> (d'Orbigny) -----	F	C	F	F	F	F	F	F	F	F	F	F	F	F	C	F	F	C	R	F	F	C	A	C	C	C	F	C
17. <u>Melonis</u> sp. -----	-	-	-	-	-	-	-	F	C	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	
18. <u>Nonionellina applini</u> (Howe and Wallace) -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	R	F	-
19. <u>Plectofrondicularia packardii</u> Cushman and Schenck -	-	A	-	-	-	-	F	R	C	F	-	-	-	-	R	-	-	F	-	-	F	C	-	F	F	F	F	A
20. <u>Plectofrondicularia</u> spp. -----	F	C	R	-	-	-	F	F	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	F	-	-	-	-
21. <u>Pullenia salisburyi</u> Stewart and Stewart -----	-	F	-	-	-	-	-	-	R	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	R	-
22. <u>Guttulina frankei</u> Cushman and Ozawa -----	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-
23. <u>Gyroidina soldanii</u> d'Orbigny -----	-	F	F	-	-	-	-	-	-	-	-	-	-	R	R	-	-	-	-	-	-	-	-	F	F	F	R	F
24. <u>Lagena vulgaris</u> Williamson -----	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25. <u>Marginulina subullata</u> Hantken of Mallory -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26. <u>Alabamina kernensis</u> Smith -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27. <u>Anomalina californiensis</u> Cushman and Hobson -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28. <u>Ceratobulimina washburnei</u> Cushman and Schenck -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	R	R	-	-	-	-	-	-	-	-	F	-	-
29. <u>Guttulina problema</u> d'Orbigny -----	-	-	-	-	-	-	-	R	-	R	-	-	-	-	-	-	-	-	-	-	-	R	-	-	R	-	R	-

Appendix 5.--Fauna1 distribution chart, Wolf Creek section--continued.

Part 3D

30. <u>Lagena</u> cf. <u>L. costata</u> (Williamson)	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	-	VA 175	-
31. <u>Lenticulina</u> cf. <u>L. pseudorotulata</u> (Asano)	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	R	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	F	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	F	B0067	-	B0068	-	VA 175	-
32. <u>Marginulina</u> <u>alazaensis</u> Nuttall	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	R	B0065	-	B0066	-	B0067	R	B0068	-	VA 175	-
33. <u>Praeglobbulimina</u> <u>pupoides</u> (d'Orbigny)	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	F	B0064	R	B0065	R	B0066	R	B0067	R	B0068	R	VA 175	-
34. <u>Pseudonodosaria</u> <u>conica</u> (Neugeboren)	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	R	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	F	B0068	-	VA 175	-
35. <u>Signomorphina</u> <u>schlencki</u> Cushman and Ozawa	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	-	VA 175	-
36. <u>Cyclammina</u> <u>pacifica</u> Beck	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	-	VA 175	-
37. <u>Guttulina</u> <u>hantkeni</u> Cushman and Ozawa	-----	UCC 11-5	-	UCC 12-1	-	B0080	R	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	R	B0065	-	B0066	F	B0067	-	B0068	-	VA 175	-
38. <u>Guttulina</u> spp.	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	-	VA 175	-
39. <u>Lenticulina</u> <u>limbosa</u> <u>hockleyensis</u> (Cushman and Applin)	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	F	B0066	F	B0067	-	B0068	R	VA 175	-
40. <u>Cibicides</u> <u>natlandi</u> Beck	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	-	VA 175	-
41. <u>Glandulina</u> <u>laevigata</u> (d'Orbigny)	-----	UCC 11-5	-	UCC 12-1	-	B0080	F	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	R	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	R	B0068	R	VA 175	-
42. <u>Globulina</u> sp.	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	R	VA 175	-
43. <u>Lenticulina</u> <u>welchi</u> (Church)	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	-	VA 175	-
44. <u>Marginulina</u> <u>adunca</u> (Costa)	-----	UCC 11-5	-	UCC 12-1	-	B0080	-	UCC 12-2	-	B0081	-	UCC 12-3	-	UCC 12-4	-	UCC 12-5	-	UCC 12-6	-	UCC 12-7	-	UCC 12-8	-	UCC 12-9	-	UCC 12-10	-	UCC 12-11	-	B0060	-	B0061	-	B0062	-	B0063	-	KAM104	-	KAM105	-	KAM106	-	KAM107	-	B0064	-	B0065	-	B0066	-	B0067	-	B0068	-	VA 175	-

Appendix 6.--Faunal distribution chart, Castor Creek section.

[A = Abundant (> 50 specimens); C = Common (20-50 specimens);

F = Few (2-19 specimens); R = Rare (< 1 specimen);

? = Questionable occurrence.]

	VA 142B	VA 143A	VA 143B	VA 143C	VA 143D	VA 143E	VA 143F	VA 143G	VA 143H	VA 143I	VA 143K	VA 145	B0094	B0093	B0092	B0091	B0090
1. <u>Alabamina kernensis</u> Smith -----	-	A	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-
2. <u>Bolivina</u> spp. -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. <u>Caucasina schencki</u> (Beck) -----	-	F	-	-	-	-	-	-	R	-	-	-	-	-	R	-	-
4. <u>Elphidium</u> cf. <u>E. texana</u> (Cushman and Applin) -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. <u>Globocassidulina globosa</u> (Hantken) -----	-	F	-	-	F	F	-	-	-	-	-	-	-	-	-	C	-
6. <u>Guttulina irregularis</u> (d'Orbigny) -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-
7. <u>Fursenkoina bramletti</u> (Galloway and Morrey) -----	-	F	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-
8. <u>Lenticulina inornata</u> (d'Orbigny) -----	-	A	-	-	-	F	R	F	-	R	-	-	-	-	-	A	-
9. <u>Lenticulina welchi</u> (Church) -----	-	F	-	-	C	F	-	-	-	-	R	-	-	-	-	F	-
10. <u>Nodosaria longiscata</u> d'Orbigny -----	-	F	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-
11. <u>Nonionellina applini</u> (Howe and Wallace) -----	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12. <u>Plectofrondicularia gracilis</u> Smith -----	-	F	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-
13. <u>Praeglobbulimina ovata</u> (d'Orbigny) -----	-	A	R	-	A	A	F	A	F	R	F	A	-	F	R	A	-

Appendix 6.--Faunal distribution chart, Castor Creek section--continued.

45. ? <u>Nonion</u> sp. -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	F	B0091	-	B0090	-
46. <u>Pullenia salisburyi</u> Stewart and Stewart -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	R	B0091	-	B0090	-
47. <u>Robertina washingtonensis</u> Beck -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	R	B0091	-	B0090	-
48. <u>Cibicides natlandi</u> Beck -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	-	B0091	F	B0090	-
49. <u>Guttulina problema</u> d'Orbigny -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	-	B0091	R	B0090	-
50. <u>Lagena hexagona</u> (Williamson) -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	-	B0091	R	B0090	-
ASSOCIATED ORGANISMS																																		
51. Diatoms -----	VA 142B	A	VA 143A	A	VA 143B	C	VA 143C	F	VA 143D	F	VA 143E	F	VA 143F	F	VA 143G	A	VA 143H	F	VA 143I	A	VA 143K	C	VA 145	-	B0094	C	B0093	R	B0092	-	B0091	-	B0090	F
52. Radiolarians -----	VA 142B	A	VA 143A	A	VA 143B	C	VA 143C	-	VA 143D	F	VA 143E	C	VA 143F	F	VA 143G	A	VA 143H	C	VA 143I	-	VA 143K	C	VA 145	-	B0094	C	B0093	R	B0092	-	B0091	-	B0090	F
53. Sponge spicules -----	VA 142B	-	VA 143A	F	VA 143B	C	VA 143C	F	VA 143D	F	VA 143E	F	VA 143F	F	VA 143G	F	VA 143H	C	VA 143I	C	VA 143K	F	VA 145	-	B0094	R	B0093	-	B0092	F	B0091	A	B0090	F
54. Echinoid spines -----	VA 142B	-	VA 143A	-	VA 143B	F	VA 143C	-	VA 143D	F	VA 143E	F	VA 143F	-	VA 143G	F	VA 143H	F	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	-	B0091	-	B0090	-
55. Fish debris -----	VA 142B	-	VA 143A	-	VA 143B	F	VA 143C	F	VA 143D	F	VA 143E	R	VA 143F	-	VA 143G	F	VA 143H	-	VA 143I	-	VA 143K	F	VA 145	-	B0094	-	B0093	-	B0092	-	B0091	F	B0090	-
56. Megafossil fragments -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	R	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	F	B0093	-	B0092	-	B0091	F	B0090	-
57. Ostracods -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	R	B0093	-	B0092	F	B0091	-	B0090	-
58. Geodites -----	VA 142B	-	VA 143A	-	VA 143B	-	VA 143C	-	VA 143D	-	VA 143E	-	VA 143F	-	VA 143G	-	VA 143H	-	VA 143I	-	VA 143K	-	VA 145	-	B0094	-	B0093	-	B0092	-	B0091	C	B0090	F

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 3A

30.	<i>Plectofrondicularia gracilis</i> Smith	KAM 252	-	KAM 254	F	KAM 1001	F	KAM 1002	F	KAM 1003	F	KAM 1004	-	KAM 1005	-	KAM 1010	-	KAM 1011	-	KAM 1012	-	KAM 1013	-	KAM 1014	-	KAM 1015	-	KAM 1017	F	KAM 1018	F	KAM 1019	F	KAM 1027	-		
31.	<i>Plectofrondicularia packardii</i> Cushman and Schenck	KAM 252	-	KAM 1004	C	KAM 1005	-	KAM 1010	F	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	F	KAM 1018	F	KAM 1019	F	KAM 1023	F	KAM 1024	F	KAM 1025	C	KAM 1026	F	KAM 1027	-	KAM 1028	F	KAM 1029	F	KAM 1030	F
32.	<i>Plectofrondicularia</i> spp.	KAM 252	-	KAM 1003	F	KAM 1005	R	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	R	KAM 1018	R	KAM 1019	-	KAM 1023	C	KAM 1024	C	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
33.	<i>Praeglobulimina ovata</i> (d'Orbigny)	KAM 252	-	KAM 1003	F	KAM 1004	-	KAM 1010	R	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
34.	<i>Pseudonodosaria conica</i> (Neugeboren)	KAM 252	-	KAM 1003	F	KAM 1004	-	KAM 1010	-	KAM 1011	-	KAM 1014	R	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
35.	<i>Pseudonodosaria inflata</i> (Costa)	KAM 252	-	KAM 1003	F	KAM 1004	R	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	F	KAM 1027	-	KAM 1028	F	KAM 1029	F	KAM 1030	F
36.	<i>Pullenia salisburyi</i> Stewart and Stewart	KAM 252	-	KAM 1003	R	KAM 1004	-	KAM 1010	R	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	R	KAM 1026	-	KAM 1027	-	KAM 1028	R	KAM 1029	F	KAM 1030	-
37.	<i>Pyrulina fusiformis</i> (Roemer)	KAM 252	-	KAM 1003	R	KAM 1004	-	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	R	KAM 1029	-	KAM 1030	-
38.	<i>Quinqueloculina imperialis</i> Hanna and Hanna	KAM 252	-	KAM 1003	F	KAM 1004	-	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	R	KAM 1025	R	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
39.	<i>Saracenaria hantkeni</i> Cushman	KAM 252	-	KAM 1003	R	KAM 1004	-	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
40.	<i>Stilostomella adolphina</i> (d'Orbigny)	KAM 252	-	KAM 1003	R	KAM 1004	-	KAM 1010	F	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
41.	<i>Trochammina globigeriniformis</i> (Parker and Jones)	KAM 252	-	KAM 1003	F	KAM 1004	-	KAM 1010	-	KAM 1011	R	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
42.	<i>Praeglobulimina ovata cowlitzensis</i> Beck	KAM 252	-	KAM 1003	C	KAM 1004	F	KAM 1010	-	KAM 1011	-	KAM 1014	F	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
43.	<i>Cibicides natalandi oleariensis</i> Beck	KAM 252	-	KAM 1003	F	KAM 1004	-	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
44.	<i>Cyclogyra byramensis</i> Cushman	KAM 252	-	KAM 1003	F	KAM 1004	-	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	-	KAM 1029	-	KAM 1030	-
45.	<i>Dentalina</i> spp.	KAM 252	-	KAM 1003	F	KAM 1004	R	KAM 1010	-	KAM 1011	-	KAM 1014	-	KAM 1015	-	KAM 1017	-	KAM 1018	-	KAM 1019	-	KAM 1023	-	KAM 1024	-	KAM 1025	-	KAM 1026	-	KAM 1027	-	KAM 1028	R	KAM 1029	-	KAM 1030	-

Appendix 7.--Faunal distribution chart, Rock Creek section--Continued.

Part 9A

	KAM 252	KAM 254	KAM 1001	KAM 1002	KAM 1003	KAM 1004	KAM 1005	KAM 1015	KAM 1014	KAM 1013	KAM 1012	KAM 1011	KAM 1010	KAM 1009	KAM 1008	KAM 1006	KAM 1007	KAM 1020	KAM 1021	KAM 1022	KAM 1023	KAM 1024	KAM 1025	KAM 1016	KAM 1017	KAM 1018	KAM 1019	KAM 1027
122. <u>Melonis</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	F	C	-	C	F	-	R	F
123. <u>Quinqueloculina weaveri</u> Rau -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	R	-	R	-	R	-	F	-	
124. <u>Guttulina frankei</u> Cushman and Ozawa -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	R	
125. <u>Quinqueloculina</u> spp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	
126. <u>Dentalina duseburyi</u> Beck -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	
127. <u>Dorothia</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	
128. <u>Pseudonodosaria</u> cf. <u>P. confca</u> (Neugeboren) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	
129. <u>Fissurina</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	
130. <u>Guttulina</u> cf. <u>G. hantkeni</u> Cushman and Ozawa -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	
131. <u>Guttulina</u> cf. <u>G. orientalis</u> Cushman and Ozawa -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	
132. <u>Lenticulina</u> sp. A -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	F	R	-	-	-	
133. <u>Parafissurina</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	
134. <u>Plectofrondicularia packardi</u> <u>multilineata</u> Cushman and Simonsen -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	
135. <u>Quinqueloculina</u> cf. <u>Q. goodspeedi</u> Hanna and Hanna -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	F	

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 11A

151.	<u>Gaudryina alazaensis</u> Cushman -----	KAM 252	.
152.	<u>Plectrofrondicularia oregonensis</u> Stewart and Stewart -----	KAM 254	.
153.	<u>Uvigerina cocoaensis</u> species group -----	KAM 1001	.
154.	<u>Bolivina jacksonensis</u> <u>striatella</u> Cushman and Applin -----	KAM 1002	.
155.	<u>Glandulina laevigata</u> (d'Orbigny) -----	KAM 1003	.
156.	<u>Lagena hexagona</u> (Williamson) -----	KAM 1004	.
157.	<u>Pseudonodosaria</u> sp. -----	KAM 1005	.
158.	<u>Bulimina</u> spp. -----	KAM 1006	.
159.	<u>Anomalina californiensis</u> Cushman and Hobson -----	KAM 1007	.
160.	<u>Marginulina subbullata</u> Hantken of Mallory -----	KAM 1008	.
161.	<u>Eponides</u> sp. -----	KAM 1009	.
162.	<u>Lagena semistriata</u> Williamson -----	KAM 1010	.
163.	<u>Reophax</u> sp. -----	KAM 1011	.
164.	<u>Gyroldina orbicularis planata</u> Cushman -----	KAM 1012	.
		KAM 1013	.
		KAM 1014	.
		KAM 1015	.
		KAM 1016	.
		KAM 1017	.
		KAM 1018	.
		KAM 1019	.
		KAM 1020	.
		KAM 1021	.
		KAM 1022	.
		KAM 1023	.
		KAM 1024	.
		KAM 1025	.
		KAM 1026	.
		KAM 1027	.

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 13A

	KAM 252	KAM 254	KAM 1001	KAM 1002	KAM 1003	KAM 1004	KAM 1005	KAM 1015	KAM 1014	KAM 1013	KAM 1012	KAM 1011	KAM 1010	KAM 1009	KAM 1008	KAM 1006	KAM 1007	KAM 1020	KAM 1021	KAM 1022	KAM 1023	KAM 1024	KAM 1025	KAM 1016	KAM 1017	KAM 1018	KAM 1019	KAM 1027	
179. <u>Globigerina senilis</u> Bandy -----	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
180. <u>Globigerina index</u> (Finlay) -----	-	-	-	-	-	-	-	-	-	-	F	-	-	-	?	-	-	-	-	-	-	-	-	-	-	-	-	-	
181. <u>Pseudohastigerina lillisi</u> (Church) -----	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
182. <u>Pseudohastigerina micra</u> (Cole) -----	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
183. <u>Globigerina officinalis</u> Subbotina -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	
184. <u>Globigerina utilis</u> Jenkins and Orr -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	
185. <u>Globorotalia insolita</u> Jenkins -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
186. <u>Globigerina tapuriensis</u> Blow and Banner -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
187. <u>Globigerina tripartita</u> Koch -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
188. <u>Chilogrammina cubensis</u> (Palmer) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
189. <u>Globigerina ouachitaensis</u> Howe and Wallace -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
190. <u>Globigerina</u> cf. <u>G. praebulloides</u> Blow -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
191. <u>Globorotaloides suteri</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
192. <u>Globorotaloides</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ASSOCIATED ORGANISMS																													
193. Megafossil fragments -----	-	F	-	-	-	R	-	-	-	-	-	F	-	-	-	F	-	F	F	-	A	-	-	-	-	-	-	F	

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 14A

	KAM 252	KAM 254	KAM 1001	KAM 1002	KAM 1003	KAM 1004	KAM 1005	KAM 1015	KAM 1014	KAM 1013	KAM 1012	KAM 1011	KAM 1010	KAM 1009	KAM 1008	KAM 1006	KAM 1007	KAM 1020	KAM 1021	KAM 1022	KAM 1023	KAM 1024	KAM 1025	KAM 1016	KAM 1017	KAM 1018	KAM 1019	KAM 1027
194. Ostracods -----	-	F	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	?	-	-	R	-	-	R	R
195. Radiolarians -----	-	F	F	-	F	-	-	A	A	C	A	F	A	A	F	-	-	-	F	F	F	C	-	F	F	-	C	-
196. Fish debris -----	-	-	F	-	-	-	-	F	F	-	F	-	-	-	R	-	-	-	-	-	-	F	-	-	-	-	-	-
197. Diatoms -----	-	-	-	-	?	-	-	A	A	A	F	A	A	A	A	-	-	-	-	F	-	F	-	-	-	-	-	-
198. Geodites -----	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
199. Sponge spicules -----	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-
200. Bryozoa -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	R	-	-	-	-	-	-	-	R	-
201. Echinoid spines -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	F	-	F	A	F	-	A	R

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 2B

14.	<u>Eponides mexicanus</u> Cushman -----	F - F - - - R - - - F A C A - C - C F -	KAM 1028
15.	<u>Globbulimina pacifica</u> Cushman -----	F A F A F A F - F A A A - A - C A -	KAM 1029
16.	<u>Globocassidulina globosa</u> (Hantken) -----	F C - F F A R A - - - C A - F - C -	KAM 1030
17.	<u>Gyroldina condoni</u> (Cushman and Schenck) -----	- - - - - - - - - - - - - - - -	KAM 1031
18.	<u>Lagena costata</u> (Williamson) -----	- - - - - - - - - - - - - - - -	KAM 1032
19.	<u>Lagena vulgaris</u> Williamson -----	- - - - - - - - - - - - - - - R - -	KAM 1033
20.	<u>Lenticulina chehalisensis</u> (Rau) -----	- - - - - - - - - - - - - - - R - -	KAM 1034
21.	<u>Lenticulina</u> cf. <u>L. pseudorotulatus</u> (Asano) -----	C F F - F - F - - - - - - - - A -	KAM 1035
22.	<u>Lenticulina inornata</u> (d'Orbigny) -----	C C F F F - - - - - - - - F - -	KAM 1036
23.	<u>Lenticulina texana</u> (Cushman and Applin) -----	R - - - - - - - - - - - - - - - -	KAM 1037
24.	<u>Marginulina adunca</u> (Costa) -----	- - - - - - - - - - - - - - - -	KAM 1038
25.	<u>Marginulina subrecta</u> Franke -----	- - - - - - - - - - - - - - - -	KAM 1039
26.	<u>Nodosaria deliciae</u> Martin -----	- - - - - - - - - - - - - - - -	KAM 248
27.	<u>Nodosaria longiscata</u> d'Orbigny -----	- F - - R - - - - - R - - A R -	KAM 249
28.	<u>Nodosaria pyrula</u> d'Orbigny -----	F F F R - - - - - - - - F - -	KAM 250
29.	<u>Nonion halkyardi</u> Cushman -----	R F - - F - R - - - - - - - R -	KAM 251
			KAM 255
			KAM 234
			KAM 1039
			KAM 240
			KAM 239
			KAM 233
			KAM 230
			KAM 231
			KAM 232
			KAM 246
			KAM 247
			KAM 229
			KAM 228

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 10B

136. <u>Sigmomorphina schencki</u> Cushman -----	KAM 1028	-
137. <u>Lenticulina</u> cf. <u>L. terryi</u> (Coryell and Embich) ----	KAM 1029	-
138. <u>Marginulina</u> sp. of Fairchild and others -----	KAM 1036	-
139. <u>Plectofrondicularia</u> cf. <u>P. vaughani</u> Cushman -----	KAM 1035	F
140. <u>Marginulina glabrata</u> d'Orbigny -----	KAM 1034	-
141. <u>Globulina gibba</u> (d'Orbigny) -----	KAM 1033	-
142. <u>Planularia crepidula</u> (Fichtel and Moll) -----	KAM 1032	-
143. <u>Alabamina kernensis</u> Smith -----	KAM 1031	-
144. <u>Marginulina exima</u> Neugeboren -----	KAM 1030	-
145. <u>Plectofrondicularia searsi</u> Cushman, Stewart, and Stewart -----	KAM 1029	R
146. <u>Robertina washingtonensis</u> Beck -----	KAM 1028	R
147. <u>Astigerina crassaformis</u> Cushman and Siegfus -----	KAM 248	R
148. <u>Budashevaella</u> sp. -----	KAM 249	F
149. <u>Caucasina schencki</u> (Beck) -----	KAM 250	R
150. <u>Dorotheia</u> sp. A -----	KAM 251	R
	KAM 234	F
	KAM 235	-
	KAM 236	-
	KAM 237	-
	KAM 238	-
	KAM 239	-
	KAM 240	-
	KAM 241	-
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Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 8C

106.	<u>Fursenkoina hobsoni</u> Beck -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	F	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	F	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	F	KAM 220	-
107.	<u>Guttulina</u> spp. -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
108.	<u>Stilostomella</u> sp. A -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
109.	<u>Bathysiphon</u> spp. -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	F	KAM 241	-	KAM 238	R	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	F	KAM 255	R	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	F	KAM 1042	-	KAM 220	-
110.	<u>Bulimina sculptilis lacinata</u> Cushman and Parker --	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
111.	<u>Cibicides haydoni</u> (Cushman and Schenck) -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
112.	<u>Ceratobulimina washburnei</u> Cushman and Schenck -----	KAM 227	-	KAM 226	R	KAM 245	F	KAM 244	F	KAM 243	F	KAM 242	F	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	F	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	F	KAM 1041	R	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
113.	<u>Cibicides elmaensis</u> Rau -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	F	KAM 242	A	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	A	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	F	KAM 1040	F	KAM 1045	-	KAM 1044	R	KAM 1043	F	KAM 1042	-	KAM 220	-
114.	<u>Cyclamina incisa</u> (Stache) -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
115.	<u>Globobulimina</u> spp. -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
116.	<u>Guttulina hantkeni</u> Cushman and Ozawa -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	R	KAM 1043	-	KAM 1042	-	KAM 220	-
117.	<u>Guttulina irregularis</u> (d'Orbigny) -----	KAM 227	-	KAM 226	-	KAM 245	F	KAM 244	F	KAM 243	F	KAM 242	F	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	C	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	F	KAM 1042	F	KAM 220	R
118.	<u>Guttulina problema</u> d'Orbigny -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	R	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
119.	<u>Hoeglundina eocenica</u> (Cushman and Hanna) -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	C	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
120.	<u>Karrerella washingtonensis</u> Rau -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	F	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	R	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	-	KAM 1042	-	KAM 220	-
121.	<u>Lenticulina lincolnensis</u> (Rau) -----	KAM 227	-	KAM 226	-	KAM 245	-	KAM 244	-	KAM 243	R	KAM 242	-	KAM 241	-	KAM 238	-	KAM 237	-	KAM 236	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 255	-	KAM 216	-	KAM 217	-	KAM 218	-	KAM 219	-	KAM 215	-	KAM 1041	-	KAM 1040	-	KAM 1045	-	KAM 1044	-	KAM 1043	R	KAM 1042	-	KAM 220	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 10C

136.	<u>Sigmomorphina schencki</u> Cushman -----	KAM 227	-	KAM 226	-	KAM 225	-	KAM 224	-	KAM 223	-	KAM 222	-	KAM 221	-	KAM 220	-
137.	<u>Lenticulina</u> cf. <u>L. terryi</u> (Coryell and Embich) ----	KAM 247	-	KAM 246	-	KAM 245	-	KAM 244	-	KAM 243	-	KAM 242	-	KAM 241	-	KAM 240	-
138.	<u>Marginulina</u> sp. of Fairchild and others -----	KAM 257	-	KAM 256	-	KAM 255	-	KAM 254	-	KAM 253	-	KAM 252	-	KAM 251	-	KAM 250	-
139.	<u>Plectofrondicularia</u> cf. <u>P. vaughani</u> Cushman -----	KAM 267	-	KAM 266	-	KAM 265	-	KAM 264	-	KAM 263	-	KAM 262	-	KAM 261	-	KAM 260	-
140.	<u>Marginulina glabrata</u> d'Orbigny -----	KAM 277	-	KAM 276	-	KAM 275	-	KAM 274	-	KAM 273	-	KAM 272	-	KAM 271	-	KAM 270	-
141.	<u>Globulina gibba</u> (d'Orbigny) -----	KAM 287	-	KAM 286	-	KAM 285	-	KAM 284	-	KAM 283	-	KAM 282	-	KAM 281	-	KAM 280	-
142.	<u>Planularia crepidula</u> (Fichtel and Moll) -----	KAM 297	-	KAM 296	-	KAM 295	-	KAM 294	-	KAM 293	-	KAM 292	-	KAM 291	-	KAM 290	-
143.	<u>Alabamina kernensis</u> Smith -----	KAM 307	-	KAM 306	-	KAM 305	-	KAM 304	-	KAM 303	-	KAM 302	-	KAM 301	-	KAM 300	-
144.	<u>Marginulina exima</u> Neugeboren -----	KAM 317	-	KAM 316	-	KAM 315	-	KAM 314	-	KAM 313	-	KAM 312	-	KAM 311	-	KAM 310	-
145.	<u>Plectofrondicularia searsi</u> Cushman, Stewart, and Stewart -----	KAM 327	-	KAM 326	-	KAM 325	-	KAM 324	-	KAM 323	-	KAM 322	-	KAM 321	-	KAM 320	-
146.	<u>Robertina washingtonensis</u> Beck -----	KAM 337	-	KAM 336	-	KAM 335	-	KAM 334	-	KAM 333	-	KAM 332	-	KAM 331	-	KAM 330	-
147.	<u>Astigerina crassaformis</u> Cushman and Stegfus -----	KAM 347	-	KAM 346	-	KAM 345	-	KAM 344	-	KAM 343	-	KAM 342	-	KAM 341	-	KAM 340	-
148.	<u>Budashevaella</u> sp. -----	KAM 357	-	KAM 356	-	KAM 355	-	KAM 354	-	KAM 353	-	KAM 352	-	KAM 351	-	KAM 350	-
149.	<u>Caucasina schencki</u> (Beck) -----	KAM 367	-	KAM 366	-	KAM 365	-	KAM 364	-	KAM 363	-	KAM 362	-	KAM 361	-	KAM 360	-
150.	<u>Dorothis</u> sp. -----	KAM 377	-	KAM 376	-	KAM 375	-	KAM 374	-	KAM 373	-	KAM 372	-	KAM 371	-	KAM 370	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

179. <u>Globigerina senflis Bandy</u> -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
180. <u>Globigerinatheka index (Finlay)</u> -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
181. <u>Pseudohastigerina lillisi (Church)</u> -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
182. <u>Pseudohastigerina micra (Cole)</u> -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
183. <u>Globigerina officinalis Subbotina</u> -----	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
184. <u>Globigerina utilisindex Jenkins and Orr</u> -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
185. <u>Gloorotalia insolita Jenkins</u> -----	-	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
186. <u>Globigerina tapuriensis Blow and Banner</u> -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
187. <u>Globigerina tripartita Koch</u> -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
188. <u>Chiloguembelina cubensis (Palmer)</u> -----	-	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
189. <u>Globigerina ouachitaensis Howe and Wallace</u> -----	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
190. <u>Globigerina cf. G. praeubulloides Blow</u> -----	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
191. <u>Globorotaloides suteri Bolli</u> -----	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
192. <u>Globorotaloides sp.</u> -----	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
ASSOCIATED ORGANISMS																												
193. Megafossil fragments -----	-	-	-	-	-	-	-	-	F	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	KAM 227	KAM 226	KAM 245	KAM 244	KAM 243	KAM 242	KAM 241	KAM 238	KAM 237	KAM 236	KAM 225	KAM 224	KAM 223	KAM 222	KAM 255	KAM 216	KAM 217	KAM 218	KAM 219	KAM 215	KAM 1041	KAM 1040	KAM 1045	KAM 1044	KAM 1043	KAM 1042	KAM 221	KAM 220

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 1D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
BENTHIC FORAMINIFERA							
1. <u>Allomorphina trigona</u> Reuss -----	-	-	-	-	-	-	-
2. <u>Bathysiphon eocenica</u> Cushman and Hanna -----	-	-	-	-	F	-	-
3. <u>Bathysiphon</u> sp. B -----	-	-	-	-	-	-	-
4. <u>Bolivina kleinpelli</u> Beck -----	-	-	-	-	-	-	-
5. <u>Budashevaella multimeratus</u> (Voloshinova) -----	-	-	-	-	-	-	-
6. <u>Chilostomella cylindroides</u> Reuss -----	-	-	-	-	-	-	-
7. <u>Boldia hodgei</u> (Cushman and Schenck) -----	-	-	-	-	-	-	-
8. <u>Cibicides natlandi</u> Beck -----	-	-	-	-	-	-	-
9. <u>Cibicides</u> sp. -----	-	-	-	-	-	-	-
10. <u>Cyclamina pacifica</u> Beck -----	R	F	-	-	-	-	-
11. <u>Dentalina coccoensis</u> (Cushman) -----	-	-	-	-	-	-	-
12. <u>Dentalina consobrina</u> d'Orbigny -----	-	-	-	-	-	-	-
13. <u>Dorothia</u> sp. B -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 2D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
14. <u>Eponides mexicanus</u> Cushman -----	-	-	-	F	-	-	-
15. <u>Globulimina pacifica</u> Cushman -----	-	F	R	-	-	-	-
16. <u>Globocassidulina globosa</u> (Hantken) -----	-	-	-	F	-	-	-
17. <u>Gyroldina condoni</u> (Cushman and Schenck) -----	-	-	-	-	-	-	-
18. <u>Lagena costata</u> (Williamson) -----	-	-	-	-	-	-	-
19. <u>Lagena vulgaris</u> Williamson -----	-	-	-	R	-	-	-
20. <u>Lenticulina chehalisensis</u> (Rau) -----	-	-	-	-	-	-	-
21. <u>Lenticulina</u> cf. <u>L. pseudorotulatus</u> (Asano) -----	-	-	-	-	-	-	-
22. <u>Lenticulina inornata</u> (d'Orbigny) -----	-	-	-	F	-	-	-
23. <u>Lenticulina texana</u> (Cushman and Applin) -----	-	-	-	-	-	-	-
24. <u>Marginulina adunca</u> (Costa) -----	-	-	-	-	-	-	-
25. <u>Marginulina subrecta</u> Franke -----	-	-	-	-	-	-	-
26. <u>Nodosaria deliciae</u> Martin -----	-	-	-	-	-	-	-
27. <u>Nodosaria longiscata</u> d'Orbigny -----	-	-	-	F	-	-	-
28. <u>Nodosaria pyrula</u> d'Orbigny -----	-	-	-	-	-	-	-
29. <u>Nonion halkyardi</u> Cushman -----	-	-	-	R	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 30

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
30. <u>Plectofrondicularia gracilis</u> Smith -----	-	-	-	-	-	-	-
31. <u>Plectofrondicularia packardii</u> Cushman and Schenck -----	-	-	-	-	-	-	-
32. <u>Plectofrondicularia</u> spp. -----	-	-	-	-	-	-	-
33. <u>Praeglobbulimina ovata</u> (d'Orbigny) -----	-	-	-	-	-	-	-
34. <u>Pseudonodosaria conica</u> (Neugeboren) -----	-	-	-	-	-	-	-
35. <u>Pseudonodosaria inflata</u> (Costa) -----	-	-	-	-	-	-	-
36. <u>Pullenia salisburyi</u> Stewart and Stewart -----	-	-	-	-	-	-	-
37. <u>Pyulina fusiformis</u> (Roemer) -----	-	-	-	-	-	-	-
38. <u>Quinqueloculina imperialis</u> Hanna and Hanna -----	-	-	-	-	-	-	-
39. <u>Saracenaria hantkeni</u> Cushman -----	-	-	-	-	-	-	-
40. <u>Stilostomella adolphina</u> (d'Orbigny) -----	-	-	-	-	-	-	-
41. <u>Trochammina globigeriniformis</u> (Parker and Jones) -----	-	-	-	-	-	-	-
42. <u>Praeglobbulimina ovata cowlitzensis</u> Beck -----	-	-	-	-	-	-	-
43. <u>Cibicides natlandi olequaensis</u> Beck -----	-	-	-	-	-	-	-
44. <u>Cyclogyra byramensis</u> Cushman -----	-	-	-	-	-	-	-
45. <u>Dentalina</u> spp. -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 4D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
46. <u>Lagena becki</u> Sullivan -----	-	-	-	-	-	-	-
47. <u>Lenticulina crassa</u> (d'Orbigny) -----	-	-	-	-	-	-	-
48. <u>Lenticulina</u> spp. -----	-	-	-	F	-	-	-
49. <u>Lenticulina welchi</u> (Church) -----	-	-	-	-	-	-	-
50. <u>Lenticulina</u> cf. <u>L. welchi</u> (Church) -----	-	-	-	-	-	-	-
51. <u>Marginalina alazaensis</u> Nuttall -----	-	-	-	-	-	-	-
52. <u>Nonion planatum</u> Cushman and Thomas -----	-	-	-	-	-	-	-
53. <u>Nonionellina applini</u> (Howe and Wallace) -----	-	-	-	-	-	-	-
54. <u>Plectofrondicularia vaughani</u> Cushman -----	-	-	-	-	-	-	-
55. <u>Pseudonodosaria cylindracea</u> (Reuss) -----	-	-	-	-	-	-	-
56. <u>Stilostomella advena</u> (Cushman and Laiming) -----	-	-	-	-	-	-	-
57. <u>Stilostomella lepidula</u> (Schwager) -----	-	-	-	-	-	-	-
58. <u>?Uvigerina garzaensis</u> Cushman and Siegfus -----	-	-	-	-	-	-	-
59. <u>Haplophragmoides</u> spp. -----	-	-	-	-	-	-	-
60. <u>Trifarina hannah</u> (Beck) -----	-	-	-	-	-	-	-
61. <u>Bolivina gardnerae</u> Cushman -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 5D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
62. <u>Bolivina jacksonensis</u> Cushman and Applin -----	-	-	-	-	-	-	-
63. <u>Bolivina pisciformis</u> Galloway and Morrey -----	-	-	-	-	-	-	-
64. <u>Bolivina scabrata</u> Cushman and Bermudez -----	-	-	-	-	-	-	-
65. <u>Bolivina</u> spp. -----	-	-	-	-	-	-	-
66. <u>Bullimina corrugata</u> Cushman and Siegfus -----	-	-	-	-	-	-	-
67. <u>Bulimina microcostata</u> Cushman and Parker -----	-	-	-	-	-	-	-
68. <u>Cibicides pseudoungerianus evolutus</u> Cushman and Hobson -----	-	-	-	-	-	-	-
69. <u>Cyclammina</u> spp. -----	-	-	-	-	-	-	-
70. <u>Fursenkoina bramletti</u> (Galloway and Morrey) -----	-	-	-	-	-	-	-
71. <u>Gyroldina soldanii octocamerata</u> Cushman and Hanna -----	-	-	-	-	-	-	-
72. <u>Lenticulina limbosa</u> (Reuss) -----	-	-	-	-	-	-	-
73. <u>Lenticulina limbosa hockleyensis</u> (Cushman and Applin) -----	-	-	-	-	-	-	-
74. <u>Orthomorphina rohri</u> (Cushman and Stainforth) -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 6D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
75. <u>Planularia markleyana</u> Church -----	-	-	-	-	-	-	-
76. <u>Planularia tolmani</u> Cushman and Simonson -----	-	-	-	-	-	-	-
77. <u>Plectofrondicularia vokesi</u> Cushman, Stewart, and Stewart -----	-	-	-	-	-	-	-
78. <u>Spiroloculina texana</u> Cushman and Ellisor -----	-	-	-	-	-	-	-
79. <u>Uvigerina garzaensis</u> Cushman and Siegfus -----	-	-	-	-	-	-	-
80. <u>Valvulineria jacksonensis welcomensis</u> Mallory -----	-	-	-	-	-	-	-
81. <u>Valvulineria tumeyensis</u> Cushman and Simonson -----	-	-	-	-	-	-	-
82. <u>Eggerella subconica</u> Parr -----	-	-	-	-	-	-	-
83. <u>Gyroidina soldani</u> d'Orbigny -----	-	-	-	-	-	-	-
84. <u>Gyroidina</u> spp. -----	-	-	-	-	-	-	-
85. <u>Haplophragmoides deflata</u> Sullivan -----	-	-	-	-	-	-	-
86. <u>Lenticulina</u> cf. <u>L. inornata</u> (d'Orbigny) -----	-	-	-	-	-	-	-
87. <u>Nodosaria</u> spp. -----	-	-	R	-	-	-	-
88. <u>Plectofrondicularia minuta</u> Sullivan -----	-	-	-	-	-	-	-
89. <u>Praeglobobulimina</u> cf. <u>P. ovata</u> (d'Orbigny) -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 7D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
90. <u>Praeglobulimina pupoides</u> (d'Orbigny) -----	-	-	-	F	-	-	-
91. <u>Praeglobulimina</u> cf. <u>P. pupoides</u> (d'Orbigny) -----	-	-	-	-	-	-	-
92. <u>Trochammina</u> spp. -----	R	-	-	-	-	-	-
93. <u>Cyclammina</u> sp. -----	-	-	-	-	-	-	-
94. <u>Dentalina communia</u> (d'Orbigny) -----	-	-	-	-	-	-	-
95. <u>Dentalina jacksonensis</u> Cushman and Applin -----	-	-	-	F	-	-	-
96. <u>Stilostomella</u> sp. B -----	-	-	-	-	-	-	-
97. <u>Stainforthia</u> sp. -----	-	-	-	-	-	-	-
98. <u>Textularia adalta</u> Cushman -----	-	-	-	-	-	-	-
99. <u>Bathysiphon</u> sp. A -----	-	-	-	-	-	-	-
100. <u>Dorothia principiensis</u> Cushman and Bermudez -----	-	-	-	-	-	-	-
101. ? <u>Eggerella</u> sp. -----	-	-	-	-	-	-	-
102. <u>Eponides</u> cf. <u>E. mexicanus</u> Cushman -----	-	-	-	-	-	-	-
103. <u>Lenticulina nikobarensis</u> (Schwager) -----	-	-	-	-	-	-	-
104. <u>Reophax pilulifera</u> Brady -----	-	-	-	-	-	-	-
105. <u>Uvigerina yazooensis</u> Cushman -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 80

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
106. <u>Fursenkoina hobsoni</u> Beck -----	-	-	-	-	-	-	-
107. <u>Guttulina</u> spp. -----	-	-	-	-	-	-	-
108. <u>Stilostomella</u> sp. A -----	-	-	-	-	-	-	-
109. <u>Bathysiphon</u> spp. -----	-	F	R	-	-	-	-
110. <u>Bulimina sculptilis lacinata</u> Cushman and Parker -----	-	-	-	-	-	-	-
111. <u>Cibicides haydoni</u> (Cushman and Schenck) -----	-	-	-	-	-	-	-
112. <u>Ceratobulimina washburnei</u> Cushman and Schenck -----	-	-	-	-	-	-	-
113. <u>Cibicides elmaensis</u> Rau -----	-	-	-	C	-	F	-
114. <u>Cyclammina incisa</u> (Stache) -----	-	-	-	-	-	-	-
115. <u>Globobulimina</u> spp. -----	-	-	-	-	-	-	-
116. <u>Guttulina hantken</u> Cushman and Ozawa -----	-	-	-	-	-	-	-
117. <u>Guttulina irregularis</u> (d'Orbigny) -----	-	-	-	F	-	-	-
118. <u>Guttulina problema</u> d'Orbigny -----	-	-	-	-	-	R	-
119. <u>Hoeglundina eocenica</u> (Cushman and Hanna) -----	-	-	-	-	-	-	-
120. <u>Karrerella washingtonensis</u> Rau -----	-	-	-	-	-	-	-
121. <u>Lenticulina lincolnensis</u> (Rau) -----	-	-	-	F	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 90

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
122. <u>Melonis</u> sp. -----	-	-	-	F	-	R	-
123. <u>Quinqueloculina weaveri</u> Rau -----	-	-	-	-	-	-	-
124. <u>Guttulina frankei</u> Cushman and Ozawa -----	-	-	-	-	-	-	-
125. <u>Quinqueloculina</u> spp. -----	-	-	-	-	-	F	-
126. <u>Dentalina duseburyi</u> Beck -----	-	-	-	-	-	-	-
127. <u>?Dorothia</u> sp. -----	-	-	-	-	-	-	-
128. <u>Pseudonodosaria</u> cf. <u>P. conica</u> (Neugeboren) -----	-	-	-	-	-	-	-
129. <u>Fissurina</u> sp. -----	-	-	-	-	-	-	-
130. <u>Guttulina</u> cf. <u>G. hantkeni</u> Cushman and Ozawa -----	-	-	-	-	-	-	-
131. <u>Guttulina</u> cf. <u>G. orientalis</u> Cushman and Ozawa -----	-	-	-	-	-	-	-
132. <u>Lenticulina</u> sp.A -----	-	-	-	-	-	-	-
133. <u>Parafissurina</u> sp. -----	-	-	-	-	-	-	-
134. <u>Plectofrondicularia packardi</u> <u>multilineata</u> Cushman and Simonson -----	-	-	-	-	-	-	-
135. <u>Quinqueloculina</u> cf. <u>Q. goodspeedi</u> Hanna and Hanna -----	-	-	-	-	-	R	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 100

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
136. <u>Sigmorphina schencki</u> Cushman -----	-	-	-	?	-	-	-
137. <u>Lenticulina</u> cf. <u>L. terryi</u> (Coryell and Embich) -----	-	-	-	-	-	-	-
138. <u>Marginulina</u> sp. of Fairchild and others -----	-	-	-	-	-	-	-
139. <u>Plectofrondicularia</u> cf. <u>P. vaughani</u> Cushman -----	-	-	-	-	-	-	-
140. <u>Marginulina glabrata</u> d'Orbigny -----	-	-	-	-	-	-	-
141. <u>Globulina gibba</u> (d'Orbigny) -----	-	-	-	-	-	-	-
142. <u>Planularia crepidula</u> (Fichtel and Moll) -----	-	-	-	-	-	-	-
143. <u>Alabamina kernensis</u> Smith -----	-	-	-	-	-	-	-
144. <u>Marginulina exima</u> Neugeboren -----	-	-	-	-	-	-	-
145. <u>Plectofrondicularia searsi</u> Cushman, Stewart, and Stewart -----	-	-	-	-	-	-	-
146. <u>Robertina washingtonensis</u> Beck -----	-	-	-	-	-	-	-
147. <u>Astigerina crassaformis</u> Cushman and Siegfus -----	-	-	-	-	-	-	-
148. <u>Budashevaella</u> sp. -----	-	-	-	-	-	-	-
149. <u>Caucasina schencki</u> (Beck) -----	-	-	-	-	-	-	-
150. <u>Dorothia</u> sp. A -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 11D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
151. <u>Gaudryina alazaensis</u> Cushman -----	-	-	-	-	-	-	-
152. <u>Plectofrondicularia oregonensis</u> Stewart and Stewart -----	-	-	-	-	-	-	-
153. <u>Uvigerina cocoaensis</u> species group -----	-	-	-	-	-	-	-
154. <u>Bolivina jacksonensis striatella</u> Cushman and Applin -----	-	-	-	-	-	-	-
155. <u>Glandulina laevigata</u> (d'Orbigny) -----	-	-	-	-	-	-	-
156. <u>Lagena hexagona</u> (Williamson) -----	-	-	-	-	-	-	-
157. <u>Pseudonodosaria</u> sp. -----	-	-	-	-	-	-	-
158. <u>Bulimina</u> spp. -----	-	-	-	-	-	-	-
159. <u>Anomalina californiensis</u> Cushman and Hobson -----	-	-	-	-	-	-	-
160. <u>Marginulina subbullata</u> Hantken of Mallory -----	-	-	-	-	-	-	-
161. <u>Eponides</u> sp. -----	-	-	-	-	-	R	-
162. <u>Lagena semistriata</u> Williamson -----	-	-	-	-	-	-	-
163. <u>Reophax</u> sp. -----	-	-	-	-	-	-	-
164. <u>Gyroldina orbicularis planata</u> Cushman -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
165. <u>Polymorphina</u> sp. -----	-	-	-	-	-	-	-
166. <u>Cibicides lobatulus</u> (Walker and Jacob) -----	-	-	-	-	-	-	-
167. <u>Globulina</u> sp. -----	-	-	-	-	-	-	-
168. <u>Karrerella</u> sp. -----	-	-	-	-	-	-	-
169. <u>Quinqueloculina imperialis porterensis</u> Rau -----	-	-	-	-	-	-	-
170. <u>Oridorsalis umbonatus</u> (Reuss) -----	-	-	-	-	-	-	-
171. <u>Ammodiscus incertus</u> (d'Orbigny) ----- R	-	-	-	-	-	-	-
PLANKTIC FORAMINIFERA							
172. <u>Globigerina</u> spp. -----	-	-	-	-	-	-	-
173. <u>Globigerina angiporooides minima</u> Jenkins -----	-	-	-	-	-	-	-
174. <u>Globigerina</u> sp. -----	-	-	-	-	-	-	-
175. <u>Catapsydrax</u> cf. <u>C. primitivus</u> (Banner and Blow) -----	-	-	-	-	-	-	-
176. <u>Globigerina</u> cf. <u>G. angiporooides angiporooides</u> Hornibrook -----	-	-	-	-	-	-	-
177. <u>Subbotina</u> cf. <u>S. linaperta</u> (Finlay) -----	-	-	-	-	-	-	-
178. <u>Globigerina pseudovenezuelana</u> Blow and Banner -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 130

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
179. <u>Globigerina senilis</u> Bandy -----	-	-	-	-	-	-	-
180. <u>Globigerinatheka index</u> (Finlay) -----	-	-	-	-	-	-	-
181. <u>Pseudohastigerina lillisi</u> (Church) -----	-	-	-	-	-	-	-
182. <u>Pseudohastigerina micra</u> (Cole) -----	-	-	-	-	-	-	-
183. <u>Globigerina officinalis</u> Subbotina -----	-	-	-	-	-	-	-
184. <u>Globigerina utilis</u> index Jenkins and Orr -----	-	-	-	-	-	-	-
185. <u>Globalotalia insolita</u> Jenkins -----	-	-	-	-	-	-	-
186. <u>Globigerina tapuriensis</u> Blow and Banner -----	-	-	-	-	-	-	-
187. <u>Globigerina tripartita</u> Koch -----	-	-	-	-	-	-	-
188. <u>Chiloguembelina cubensis</u> (Palmer) -----	-	-	-	-	-	-	-
189. <u>Globigerina ouachitaensis</u> Howe and Wallace -----	-	-	-	-	-	-	-
190. <u>Globigerina</u> cf. <u>G. praebulloides</u> Blow -----	-	-	-	-	-	-	-
191. <u>Globalotaloides suteri</u> Bolli -----	-	-	-	-	-	-	-
192. <u>Globalotaloides</u> sp. -----	-	-	-	-	-	-	-
ASSOCIATED ORGANISMS							
193. Megafossil fragments -----	-	-	-	-	-	-	-

Appendix 7.--Faunal distribution chart, Rock Creek section--continued.

Part 14D

	KAM 214	KAM 213	KAM 212	KAM 211	KAM 210	KAM 1070	KAM 268
194. Ostracods -----	-	-	-	-	-	-	-
195. Radiolarians -----	-	-	-	C	-	-	-
196. Fish debris -----	-	-	-	-	-	F	-
197. Diatoms -----	F	F	-	C	-	-	-
198. Geodites -----	-	-	-	F	-	-	-
199. Sponge spicules -----	-	F	F	F	-	-	-
200. Bryozoa -----	-	-	-	-	-	-	-
201. Echinoid spines -----	-	-	-	-	-	-	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 5A

60. <u>Gyroidina orbicularis planata</u> Cushman -----	UCC 116-3	-	UCC 110-6	-	UCC 109-2	-	UCC 109-3	-	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
61. <u>Nodosaria pyrula</u> d'Orbigny -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
62. <u>Nonionella jacksonensis</u> Cushman -----	UCC 116-1	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
63. <u>Stainforthia</u> sp. -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
64. <u>Stilostomella advena</u> (Cushman and Laiming) -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
65. <u>Bulimina macilenta</u> Cushman and Parker -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
66. <u>Cassidulinoides</u> sp. -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
67. <u>Cibicides mcmastersi</u> Beck -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
68. <u>Epistominella parva</u> (Cushman and Laiming) -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
69. <u>Marginulina exima</u> d'Orbigny -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
70. <u>Dentalina</u> spp. -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
71. <u>Trifarina hannah</u> (Beck) -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
72. <u>Arenaceous fragments</u> -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
73. <u>Pseudonodosaria inflata</u> (Costa) -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
74. <u>Plectofrondicularia</u> spp. -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-
75. <u>Cyclamina</u> sp. -----	UCC 116-2	-	UCC 110-4	-	UCC 109-1	-	UCC 110-3	F	UCC 109-4	-	UCC 109-5	-	UCC 109-6	-	UCC 109-7	-	UCC 109-8	-	UCC 109-9	-	UCC 109-10	-	UCC 108-1	-	UCC 108-2	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 2B

16. <u>Eggerella subconica</u> Parr -----	UOC 108-3	-	UOC 106-11	-	UOC 106-16	-	UOC 106-22	-
17. <u>Fursenkoina bramletti</u> (Galloway and Morrey) -----	UOC 108-4	-	UOC 106-12	-	UOC 106-9	-	UOC 90-12	-
18. <u>Lagena semistriata</u> Williamson -----	UOC 106-1	-	UOC 106-13	-	UOC 106-4	-	UOC 106-21	-
19. <u>Lenticulina</u> spp. -----	UOC 106-A	-	UOC 106-14	-	UOC 106-3	-	UOC 106-20	-
20. <u>Lenticulina welchi</u> Church -----	UOC 106-8	-	UOC 106-5	-	UOC 106-8	-	UOC 106-19	-
21. <u>Planularia tomani</u> Cushman and Simonson -----	UOC 106-4	-	UOC 106-7	-	UOC 106-15	-	UOC 106-18	-
22. <u>Stilostomella adolphina</u> (d'Orbigny) -----	UOC 106-1	-	UOC 106-13	-	UOC 106-8	-	UOC 106-10	-
23. <u>Valvulineria jacksonensis welcomensis</u> Mallory -----	UOC 108-4	-	UOC 106-12	-	UOC 106-4	-	UOC 106-2	-
24. <u>Bolivina gardnerae</u> Cushman -----	UOC 106-1	-	UOC 106-11	-	UOC 106-3	-	UOC 106-16	-
25. <u>Bolivina hunneri</u> Howe -----	UOC 106-1	-	UOC 106-6	-	UOC 106-9	-	UOC 106-16	-
26. <u>Bolivina scabrata</u> Cushman and Bermudez -----	UOC 106-1	-	UOC 106-D	-	UOC 106-9	-	UOC 106-16	-
27. <u>Globulimina pacifica</u> Cushman -----	UOC 106-1	-	UOC 106-C	-	UOC 106-9	-	UOC 106-16	-
28. <u>Guttulina</u> spp. -----	UOC 106-1	-	UOC 106-8	-	UOC 106-9	-	UOC 106-16	-
29. <u>Nonionellina applini</u> (Howe and Wallace) -----	UOC 106-1	-	UOC 106-B	-	UOC 106-9	-	UOC 106-16	-
30. <u>Orthomorphina rohri</u> (Cushman and Stainforth) -----	UOC 108-4	-	UOC 106-12	-	UOC 106-4	-	UOC 106-21	-
31. <u>Plectofrondicularia packardii</u> Cushman and Schenck -	UOC 108-3	-	UOC 106-11	-	UOC 106-3	-	UOC 106-20	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 6B

	UOC 108-3	UOC 108-4	UOC 106-1	UOC 106-A	UOC 106-B	UOC 106-C	UOC 106-D	UOC 106-6	UOC 106-11	UOC 106-12	UOC 106-13	UOC 106-7	UOC 106-5	UOC 106-14	UOC 106-8	UOC 106-15	UOC 106-4	UOC 106-3	UOC 106-9	UOC 106-16	UOC 106-2	UOC 106-10	UOC 106-18	UOC 106-19	UOC 106-20	UOC 106-21	UOC 90-12	UOC 106-22	
79. <u>Trochammina</u> spp. -----	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
80. <u>Guttulina hantkeni</u> Cushman and Ozawa -----	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
81. <u>Quinqueloculina weaveri</u> Rau -----	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	
82. <u>Uvigerina cocoensis</u> species group -----	-	-	-	-	C	-	-	F	C	C	-	F	-	F	-	-	F	F	-	F	F	F	-	F	-	C	-	A	
83. <u>Uvigerina</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
84. <u>Uvigerina atwilli</u> Cushman and Simonson -----	-	-	-	-	-	-	-	-	-	-	-	F	-	A	-	F	F	C	-	-	-	-	-	-	-	-	-	-	
85. <u>Budashevaella multimeratus</u> (Voloshinova) -----	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
86. <u>Fissurina</u> sp. -----	-	-	-	-	-	R	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	
87. <u>Spiroplectamina richardi</u> Martin -----	-	-	-	-	-	R	-	R	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
88. <u>Dentalina jacksonensis</u> Cushman and Applin -----	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C
89. <u>Quinqueloculina</u> spp. -----	-	-	-	-	-	-	-	R	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	
90. <u>Cibicides elmaensis</u> Rau -----	-	-	-	-	-	-	-	R	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	F	F	-	C
91. <u>Anomalina californiensis</u> Cushman and Hobson -----	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	
92. <u>Plectofrondicularia packardii multilineata</u> Cushman and Simonson -----	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93. <u>Dentalina duseburyi</u> Beck -----	-	-	-	-	-	-	-	-	-	-	F	-	-	-	F	-	-	-	-	-	-	-	-	-	-	F	-	-	-

Appendix 8.--Faunal distribution chart, Willapa River section--Continued.

Part 7B

94.	<u>Quinqueloculina imperialis</u> Hanna and Hanna -----	UOC 108-3	-	UOC 106-16	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 90-12	-	UOC 106-22	-
95.	<u>Guttulina irregularis</u> (d'Orbigny) -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	F	UOC 106-20	F	UOC 106-21	F	UOC 106-22	F
96.	<u>Chilostomella oplina</u> Schwager -----	UOC 108-3	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
97.	<u>Hoeglundina eocenica</u> (Cushman and Hanna) -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	F	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
98.	<u>Dentalina soluta</u> Reuss -----	UOC 108-3	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	R	UOC 106-22	-
99.	<u>Pyralina fusiformis</u> (Roemer) -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
100.	<u>Eponides mexicanus</u> Cushman -----	UOC 108-3	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
101.	<u>Spiroplectamina directa</u> (Cushman and Siegfus) -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
102.	<u>Plectofrondicularis gracilis</u> Smith -----	UOC 108-3	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
103.	<u>Pseudonodosaria</u> sp. -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
104.	<u>Ammodiscus incertus</u> (d'Orbigny) -----	UOC 108-3	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
105.	<u>Lagena becki</u> Sullivan -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
106.	<u>Melonis</u> sp. -----	UOC 108-3	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
107.	<u>Dyocibicides perforata</u> Cushman and Valentine -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
108.	<u>Karrerella washingtonensis</u> Rau -----	UOC 108-3	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-
109.	<u>Gaudryina alazaensis</u> Cushman -----	UOC 108-4	-	UOC 106-9	-	UOC 106-2	-	UOC 106-10	-	UOC 106-18	-	UOC 106-20	-	UOC 106-21	-	UOC 106-22	-

Appendix 8.---Faunal distribution chart, Willapa River section--continued.

Part 10B

139.	<u>Quinqueloculina goodspeedi</u> Hanna and Hanna -----	UCC 108-3	.	UCC 106-13	.	UCC 106-22	.
140.	<u>Sigmoilina tenuis</u> (Czjzek) -----	UCC 108-4	.	UCC 106-12	.	UCC 90-12	.
141.	<u>Marginulina</u> sp. -----	UCC 106-1	.	UCC 106-6	.	UCC 106-20	.
142.	<u>Ceratobulimina washburnei</u> Cushman and Schenck -----	UCC 106-A	.	UCC 106-8	.	UCC 106-19	.
143.	? <u>Eggerella</u> sp. -----	UCC 106-1	.	UCC 106-14	.	UCC 106-18	.
144.	<u>Plectofrondicularia vaughani</u> Cushman -----	UCC 106-1	.	UCC 106-5	.	UCC 106-10	.
145.	<u>Pseudonodosaria</u> cf. <u>P. conica</u> (Neugeboren) -----	UCC 106-1	.	UCC 106-7	.	UCC 106-16	.
146.	<u>Dentalina</u> cf. <u>D. spinosa</u> d'Orbigny -----	UCC 106-1	.	UCC 106-13	.	UCC 106-9	.
147.	<u>Vaginulina mexicana</u> Nuttall -----	UCC 106-1	.	UCC 106-15	.	UCC 106-3	.
148.	<u>Reophax pilulifera</u> Brady -----	UCC 106-1	.	UCC 106-8	.	UCC 106-4	.
149.	<u>Valvulineria</u> cf. <u>V. menloensis</u> Rau -----	UCC 106-1	.	UCC 106-14	.	UCC 106-15	.
150.	<u>Bolivina marginata</u> Cushman -----	UCC 106-1	.	UCC 106-8	.	UCC 106-16	.
151.	<u>Uvigerinella obesa</u> (Cushman) -----	UCC 106-1	.	UCC 106-14	.	UCC 106-9	.
152.	<u>Sigmomorpha pseudoschencki</u> Rau -----	UCC 106-1	.	UCC 106-14	.	UCC 106-3	.
153.	<u>Eggerella</u> sp. -----	UCC 106-1	.	UCC 106-14	.	UCC 106-9	.
154.	<u>Reophax</u> sp. -----	UCC 106-1	.	UCC 106-14	.	UCC 106-9	.

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 11B

155. <u>Nonionella labradorica</u> (Dawson) -----	UC 108-3	.	
156. <u>Glandulina laevigata</u> (d'Orbigny) -----	UC 108-4	.	
157. <u>Spirolectamina tejonensis</u> Mallory -----	UC 106-1	.	
158. <u>Lagena</u> sp. -----	UC 106-A	.	
159. <u>Plectofrondicularia vokesi</u> Cushman, Stewart, and Stewart -----	UC 106-8	.	
160. <u>Saracenaria schencki</u> Cushman and Hobson -----	UC 106-15	.	
161. <u>Pullenia bulloides</u> (d'Orbigny) -----	UC 106-14	.	
PLANKTIC FORAMINIFERA			
162. <u>Globigerina angiporooides minima</u> Jenkins -----	UC 106-9	.	
163. <u>Globigerina pseudovenezuelana</u> Blow and Banner -----	UC 106-16	.	
164. <u>Globorotaloides</u> cf. <u>G. suteri</u> Bolli -----	UC 106-3	.	
165. <u>Subbotina linaperta</u> (Finlay) -----	UC 106-4	.	
166. <u>Globigerina angiporooides angiporooides</u> Hornibrook -----	UC 106-2	.	
167. <u>Globigerina praeturritilina</u> Blow and Banner -----	UC 106-10	.	
	UC 106-18	.	
	UC 106-19	.	
	UC 106-20	.	
	UC 106-21	.	
	UC 90-12	.	
	UC 106-22	.	

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 12B

168.	<u>Globigerina primitivus</u> (Finlay) -----	UOC 108-3	-	UOC 106-13	-	UOC 106-22	-
169.	<u>Globigerina tripartita</u> (Koch) -----	UOC 108-4	-	UOC 106-14	-	UOC 90-12	-
170.	<u>Globorotaloides suteri</u> Bolli -----	UOC 106-1	-	UOC 106-8	-	UOC 106-21	-
171.	<u>Subbotina</u> cf. <u>S. linaperta</u> (Finlay) -----	UOC 106-A	-	UOC 106-14	-	UOC 106-20	-
172.	<u>Globigerina</u> spp. -----	UOC 106-1	-	UOC 106-8	-	UOC 106-19	-
173.	<u>Globigerina ouachitaensis</u> Howe and Wallace -----	UOC 106-A	R	UOC 106-14	-	UOC 106-18	-
174.	<u>Globigerina</u> cf. <u>G. senilis</u> Bandy -----	UOC 106-1	-	UOC 106-7	-	UOC 106-10	-
175.	<u>Globigerina senilis</u> Bandy -----	UOC 106-1	-	UOC 106-7	-	UOC 106-2	-
176.	<u>Globigerina officinalis</u> Subbotina -----	UOC 106-1	-	UOC 106-3	-	UOC 106-16	-
177.	<u>Globigerina utilis</u> index Jenkins and Orr -----	UOC 108-4	-	UOC 106-4	-	UOC 106-9	-
178.	<u>Globigerina angustumbilicata</u> Bolli -----	UOC 106-1	-	UOC 106-15	-	UOC 106-16	-
179.	<u>Globigerinatheka index</u> (Finlay) -----	UOC 106-1	-	UOC 106-8	-	UOC 106-2	-
180.	<u>Catapsydrax unicus</u> Bolli, Loeblich, and Tappan -	UOC 108-4	-	UOC 106-14	-	UOC 106-18	-
181.	<u>Globigerina</u> cf. <u>G. primitivus</u> (Finlay) -----	UOC 106-1	-	UOC 106-7	-	UOC 106-10	-
182.	<u>Catapsydrax gortanii</u> Borsetti -----	UOC 106-1	-	UOC 106-13	-	UOC 106-2	-
183.	<u>Chitoguembelina cubensis</u> (Palmer) -----	UOC 108-3	-	UOC 106-12	-	UOC 106-16	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 13B

	UOC 108-3	UOC 108-4	UOC 106-1	UOC 106-A	UOC 106-8	UOC 106-C	UOC 106-D	UOC 106-6	UOC 106-11	UOC 106-12	UOC 106-13	UOC 106-7	UOC 106-5	UOC 106-14	UOC 106-8	UOC 106-15	UOC 106-4	UOC 106-3	UOC 106-9	UOC 106-16	UOC 106-2	UOC 106-10	UOC 106-18	UOC 106-19	UOC 106-20	UOC 106-21	UOC 90-12	UOC 106-22			
184. <u>Catapsydrax</u> cf. <u>C. unicavus</u> Bolli,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Loeblich, and Tappan -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
185. <u>Globigerina praebulloides</u> Blow -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
186. <u>Globigerina ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
187. <u>Globigerina euapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
188. <u>Globigerina</u> cf. <u>G. pseudovenezuelana</u> Blow and Banner -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
189. <u>Globigerina galavisi</u> Bermudez -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
190. <u>Catapsydrax dissimilis</u> (Cushman and Bermudez) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
191. <u>Globigerina</u> cf. <u>G. ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
ASSOCIATED ORGANISMS																															
192. Diatoms -----	-	-	-	F	-	-	-	-	-	C	C	F	F	F	-	A	F	-	-	C	-	-	-	-	F	-	A	F	R		
193. Fish debris -----	-	R	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	R	-	F	-	-	F	-	-	-	-	-		
194. Geodites -----	-	-	F	-	-	-	-	-	-	-	F	-	-	C	C	R	-	-	-	C	-	-	-	-	-	F	-	-	-		
195. Ostracods -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
196. Radiolarians -----	-	C	-	R	-	F	F	-	F	A	A	F	-	A	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-		

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 2C

16.	<u>Eggerella subconica</u> Parr -----	UCC 106-23	-	UCC 105-1	-	UCC 106-26	-	UCC 105-13	-
17.	<u>Fursenkoina bramletti</u> (Galloway and Morrey) -----	UCC 106-24	F	UCC 105-11	-	UCC 106-25	-	UCC 105-12	?
18.	<u>Lagena semistriata</u> Williamson -----	UCC 90-11	-	UCC 90-8	-	UCC 90-10	F	UCC 90-2	-
19.	<u>Lenticulina</u> spp. -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
20.	<u>Lenticulina welchi</u> Church -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
21.	<u>Planularia tolmari</u> Cushman and Simonson -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
22.	<u>Stilostomella adolphina</u> (d'Orbigny) -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
23.	<u>Valvulineria jacksonensis welcomensis</u> Mallory -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
24.	<u>Bolivina gardnerae</u> Cushman -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
25.	<u>Bolivina hunneri</u> Howe -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
26.	<u>Bolivina scabrata</u> Cushman and Bermudez -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
27.	<u>Globulimina pacifica</u> Cushman -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
28.	<u>Guttulina</u> spp. -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
29.	<u>Nonionella applini</u> (Howe and Wallace) -----	UCC 106-24	F	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
30.	<u>Orthomorphina rohri</u> (Cushman and Stainforth) -----	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-
31.	<u>Plectofrondicularia packardii</u> Cushman and Schenck -	UCC 106-24	-	UCC 105-2	-	UCC 90-9	-	UCC 105-10	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 5C

63.	<u>Stainforthia</u> sp. -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
64.	<u>Stilostomella advena</u> (Cushman and Laimeing) -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	R	UOC 105-12	-	UOC 105-13	-
65.	<u>Bulimina macilenta</u> Cushman and Parker -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
66.	<u>Cassidulinoides</u> sp. -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
67.	<u>Cibicides mcmastersi</u> Beck -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	R	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
68.	<u>Epistominella parva</u> (Cushman and Laimeing) -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	F	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
69.	<u>Marginulina exima</u> d'Orbigny -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
70.	<u>Dentalina</u> spp. -----	UOC 106-23	F	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	R	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
71.	<u>Trifarina hanna</u> i (Beck) -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
72.	<u>Arenaceous</u> fragments -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
73.	<u>Pseudonodosaria inflata</u> (Costa) -----	UOC 106-23	F	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
74.	<u>Plectofrondicularia</u> spp. -----	UOC 106-23	F	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	F	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
75.	<u>Cyclamina</u> sp. -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
76.	<u>Dentalina cocoensis</u> (Cushman) -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
77.	<u>Oridorsalis umbonatus</u> (Reuss) -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-
78.	<u>Budashevella</u> spp. -----	UOC 106-23	-	UOC 106-24	-	UOC 90-11	-	UOC 90-10	-	UOC 106-25	-	UOC 105-1	-	UOC 90-9	-	UOC 105-2	-	UOC 90-8	-	UOC 105-3	-	UOC 105-4	-	UOC 90-4	-	UOC 105-8	-	UOC 90-5	-	UOC 105-9	-	UOC 90-3	-	UOC 105-10	-	UOC 90-2	-	UOC 90-1	-	UOC 105-11	-	UOC 105-12	-	UOC 105-13	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 6C

79. <u>Trochammina</u> spp. -----	UOC 106-23	-	UOC 105-13	-
80. <u>Guttulina hantkeni</u> Cushman and Ozawa -----	UOC 106-24	-	UOC 105-12	-
81. <u>Quinqueloculina weaveri</u> Rau -----	UOC 106-25	-	UOC 105-11	-
82. <u>Uvigerina cocoaensis</u> species group -----	UOC 90-10	-	UOC 90-1	-
83. <u>Uvigerina</u> sp. -----	UOC 90-11	-	UOC 90-2	-
84. <u>Uvigerina atwilli</u> Cushman and Simonson -----	UOC 106-26	-	UOC 105-10	-
85. <u>Budashevaeella multicaeratus</u> (Voloshinova) -----	UOC 90-10	-	UOC 90-3	-
86. <u>Fissurina</u> sp. -----	UOC 90-11	-	UOC 105-9	-
87. <u>Spiroplectammina richardi</u> Martin -----	UOC 106-24	-	UOC 90-4	-
88. <u>Dentalina jacksonensis</u> Cushman and Applin -----	UOC 106-25	-	UOC 105-8	-
89. <u>Quinqueloculina</u> spp. -----	UOC 90-10	-	UOC 90-5	-
90. <u>Cibicides elmaensis</u> Rau -----	UOC 90-11	-	UOC 90-6	-
91. <u>Anomalina californiensis</u> Cushman and Hobson -----	UOC 106-24	-	UOC 105-7	-
92. <u>Plectofrondicularia packardii multilineata</u> Cushman and Simonson -----	UOC 106-25	-	UOC 105-6	-
93. <u>Dentalina duseburyi</u> Beck -----	UOC 90-10	-	UOC 90-7	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 10C

139. <u>Quinqueloculina goodspeedi</u> Hanna and Hanna -----	UCC 106-23	.
	UCC 106-24	.
	UCC 90-11	.
	UCC 90-10	.
	UCC 106-25	.
	UCC 106-26	.
	UCC 105-1	.
	UCC 90-9	.
	UCC 105-2	.
	UCC 90-8	.
	UCC 105-3	.
	UCC 105-4	.
	UCC 105-5	.
	UCC 90-7	.
	UCC 105-6	.
	UCC 105-7	.
	UCC 90-6	.
	UCC 90-5	.
	UCC 105-8	.
	UCC 90-4	.
	UCC 105-9	.
	UCC 90-3	.
	UCC 105-10	.
	UCC 90-2	.
	UCC 90-1	.
	UCC 105-11	.
	UCC 105-12	.
	UCC 105-13	.
140. <u>Sigmoina tenuis</u> (Czjzek) -----		
141. <u>Marginulina</u> sp. -----		
142. <u>Ceratobulimina washburnei</u> Cushman and Schenck -----		
143. <u>?Eggerella</u> sp. -----		
144. <u>Plectofrondicularia vaughani</u> Cushman -----		
145. <u>Pseudonodosaria</u> cf. <u>P. conica</u> (Neugeboren) -----		
146. <u>Dentalina</u> cf. <u>D. spinosa</u> d'Orbigny -----		
147. <u>Vaginulina mexicana</u> Nuttall -----		
148. <u>Reophax pilulifera</u> Brady -----		
149. <u>Valvulineria</u> cf. <u>V. menloensis</u> Rau -----		
150. <u>Bolivina marginata</u> Cushman -----		
151. <u>Uvigerinella obesa</u> (Cushman) -----		
152. <u>Sigmomorphina pseudoschencki</u> Rau -----		
153. <u>Eggerella</u> sp. -----		
154. <u>Reophax</u> sp. -----		

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 13C

184. <u>Catapsydrax</u> cf. <u>C. unicavus</u> Bolli, Loeblich, and Tappan -----	UOC 106-23	UOC 106-24	UOC 90-11	UOC 90-10	UOC 106-25	UOC 106-26	UOC 105-1	UOC 90-9	UOC 105-2	UOC 90-8	UOC 105-3	UOC 105-4	UOC 105-5	UOC 90-7	UOC 105-6	UOC 105-7	UOC 90-6	UOC 90-5	UOC 105-8	UOC 90-4	UOC 105-9	UOC 90-3	UOC 105-10	UOC 90-2	UOC 90-1	UOC 105-11	UOC 105-12	UOC 105-13			
185. <u>Globigerina praebulloides</u> Blow -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
186. <u>Globigerina ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
187. <u>Globigerina euapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
188. <u>Globigerina</u> cf. <u>G. pseudovenezuelana</u> Blow and Banner -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
189. <u>Globigerina galavisi</u> Bermudez -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
190. <u>Catapsydrax dissimilis</u> (Cushman and Bermudez) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
191. <u>Globigerina</u> cf. <u>G. ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
ASSOCIATED ORGANISMS																															
192. Diatoms -----	A	A	F	F	F	-	-	F	-	F	-	-	F	F	-	-	F	F	-	-	-	-	F	F	-	-	F	F	-		
193. Fish debris -----	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	F	-	F	-	
194. Geodites -----	-	A	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
195. Ostracods -----	-	F	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-		
196. Radiolarians -----	-	A	F	F	F	A	F	-	R	-	-	R	R	-	R	-	-	-	-	F	-	-	R	-	-	-	F	-	R		

Appendix 8.--Fauna] distribution chart, Willapa River section--continued.

Part 7D

94.	<u>Quinqueloculina imperialis</u> Hanna and Hanna -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
95.	<u>Guttulina irregularis</u> (d'Orbigny) -----	UOC 105-14	F	UOC 105-15	F	UOC 105-16	F	UOC 91-4	F	UOC 91-3	F	UOC 91-2	F	UOC 82-1	F	UOC 103-1	F	UOC 103-2	F	UOC 103-3	F	UOC 103-4	F	UOC 82-2	R	UOC 91-1	F	UOC 82-3	F	UOC 93-7	F	UOC 82-4	F	UOC 82-5	F	UOC 82-6	F	UOC 93-6	F	UOC 101-2	F	UOC 101-1	F	UOC 101-3	F	UOC 93-5	F	UOC 101-4	R	UOC 93-4	R	UOC 101-5	R	UOC 101-6	F	UOC 93-3	F
96.	<u>Chilostomella oolina</u> Schwager -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
97.	<u>Hoeglundina eocenica</u> (Cushman and Hanna) -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
98.	<u>Dentalina soluta</u> Reuss -----	UOC 105-14	F	UOC 105-15	F	UOC 105-16	F	UOC 91-4	R	UOC 91-3	F	UOC 91-2	F	UOC 82-1	F	UOC 103-1	F	UOC 103-2	F	UOC 103-3	F	UOC 103-4	F	UOC 82-2	R	UOC 91-1	F	UOC 82-3	F	UOC 93-7	F	UOC 82-4	F	UOC 82-5	F	UOC 82-6	F	UOC 93-6	F	UOC 101-2	F	UOC 101-1	F	UOC 101-3	F	UOC 93-5	F	UOC 101-4	F	UOC 93-4	F	UOC 101-5	F	UOC 101-6	F	UOC 93-3	F
99.	<u>Pyralina fusiformis</u> (Roemer) -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
100.	<u>Eponides mexicanus</u> Cushman -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	F	UOC 91-3	F	UOC 91-2	F	UOC 82-1	F	UOC 103-1	F	UOC 103-2	R	UOC 103-3	F	UOC 103-4	F	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
101.	<u>Spiroplectamina directa</u> (Cushman and Siegfus) -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
102.	<u>Plectofrondicularia gracilis</u> Smith -----	UOC 105-14	F	UOC 105-15	F	UOC 105-16	F	UOC 91-4	F	UOC 91-3	F	UOC 91-2	R	UOC 82-1	F	UOC 103-1	F	UOC 103-2	F	UOC 103-3	F	UOC 103-4	F	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	F	UOC 82-4	F	UOC 82-5	F	UOC 82-6	F	UOC 93-6	F	UOC 101-2	F	UOC 101-1	F	UOC 101-3	R	UOC 93-5	F	UOC 101-4	F	UOC 93-4	F	UOC 101-5	F	UOC 101-6	F	UOC 93-3	F
103.	<u>Pseudonodosaria</u> sp. -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	R	UOC 91-3	F	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
104.	<u>Ammodiscus incertus</u> (d'Orbigny) -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	R	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
105.	<u>Lagena becki</u> Sullivan -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
106.	<u>Melonis</u> sp. -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	R	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
107.	<u>Dyocibicides perforata</u> Cushman and Valentine -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
108.	<u>Karrerella washingtonensis</u> Rau -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
109.	<u>Gaudryina alazaensis</u> Cushman -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	R	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	C	UOC 91-1	-	UOC 82-3	-	UOC 93-7	R	UOC 82-4	F	UOC 82-5	F	UOC 82-6	F	UOC 93-6	F	UOC 101-2	R	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 100

139.	<u>Quinqueloculina goodspeedi</u> Hanna and Hanna -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
140.	<u>Sigmoilina tenuis</u> (Czjzek) -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	R	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
141.	<u>Marginulina</u> sp. -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	R	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
142.	<u>Ceratolimna washburnei</u> Cushman and Schenck -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	F	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
143.	? <u>Eggerella</u> sp. -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	R	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
144.	<u>Plectofrondicularia vaughani</u> Cushman -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	F	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
145.	<u>Pseudonodosaria</u> cf. <u>P. conica</u> (Neugeboren) -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
146.	<u>Dentalina</u> cf. <u>D. spinosa</u> d'Orbigny -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
147.	<u>Vaginulina mexicana</u> Nuttall -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
148.	<u>Reophax pilulifera</u> Brady -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
149.	<u>Valvulineria</u> cf. <u>V. menloensis</u> Rau -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
150.	<u>Bolivina marginata</u> Cushman -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
151.	<u>Uvigerinella obesa</u> (Cushman) -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
152.	<u>Sigmomorpha pseudoschencki</u> Rau -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
153.	<u>Eggerella</u> sp. -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-
154.	<u>Reophax</u> sp. -----	UOC 105-14	-	UOC 105-15	-	UOC 105-16	-	UOC 91-4	-	UOC 91-3	-	UOC 91-2	-	UOC 82-1	-	UOC 103-1	-	UOC 103-2	-	UOC 103-3	-	UOC 103-4	-	UOC 82-2	-	UOC 91-1	-	UOC 82-3	-	UOC 93-7	-	UOC 82-4	-	UOC 82-5	-	UOC 82-6	-	UOC 93-6	-	UOC 101-2	-	UOC 101-1	-	UOC 101-3	-	UOC 93-5	-	UOC 101-4	-	UOC 93-4	-	UOC 101-5	-	UOC 101-6	-	UOC 93-3	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 3E

32. <u>Stilostomella</u> spp. -----	UCC 101-7	-	UCC 93-2	UCC 101-8	UCC 93-1	UCC 101-9	UCC 101-10	UCC 101-11	UCC 101-12	UCC 101-13	UCC 101-14	UCC 101-15	UCC 101-16	UCC 101-17	UCC 101-18	UCC 101-19	UCC 101-20	UCC 101-21	UCC 101-22	UCC 101-23	UCC 94-2	UCC 94-1	UCC 101-24	UCC 101-25	UCC 94-A	UCC 101-26	UCC 101-27	UCC 101-28	UCC 101-29
33. <u>Trochammia inflata</u> (Montagu) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34. <u>Haplophragmoides deflata</u> Sullivan -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R
35. <u>Nonion planatum</u> Cushman and Thomas -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36. <u>Trochammia globigeriniformis</u> (Parker and Jones) -	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-
37. <u>Bathysiphon eocenica</u> Cushman and Hanna -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38. <u>Bolivina pisciformis</u> Galloway and Morrey -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39. <u>Bolivina</u> spp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40. <u>Bulimina</u> cf. <u>B. instabilis</u> Cushman and Parker -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41. <u>Cibicides fortunatus</u> Martin -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42. <u>Fursenkoina hobsoni</u> (Beck) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43. <u>Gyroldina soldanii</u> d'Orbigny -----	F	C	-	F	R	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
44. <u>Haplophragmides</u> spp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45. <u>Nodosaria longiscata</u> d'Orbigny -----	F	-	-	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-
46. <u>Praeglobobulimina ovata</u> (d'Orbigny) -----	F	-	-	R	-	-	-	-	F	R	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-
47. <u>Pullenia salisburyi</u> Stewart and Stewart -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	R	-	-	-	-	-	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 10E

139.	<u>Quinqueloculina goodspeedi</u> Hanna and Hanna -----	UCC 101-7	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-		
140.	<u>Sigmoilina tenuis</u> (Czjzek) -----	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-		
141.	<u>Marginulina</u> sp. -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
142.	<u>Ceratobulimina washburnei</u> Cushman and Schenck -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
143.	? <u>Eggerella</u> sp. -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
144.	<u>Plectrofrondicularia vaughani</u> Cushman -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
145.	<u>Pseudonodosaria</u> cf. <u>P. conica</u> (Neugeboren) -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
146.	<u>Dentalina</u> cf. <u>D. spinosa</u> d'Orbigny -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
147.	<u>Vaginulina mexicana</u> Nuttall -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
148.	<u>Reophax pilulifera</u> Brady -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
149.	<u>Valvulineria</u> cf. <u>V. menloensis</u> Rau -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
150.	<u>Bolivina marginata</u> Cushman -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
151.	<u>Uvigerinella obesa</u> (Cushman) -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
152.	<u>Sigmomorphina pseudoschencki</u> Rau -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
153.	<u>Eggerella</u> sp. -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-
154.	<u>Reophax</u> sp. -----	UCC 93-2	-	UCC 101-8	-	UCC 101-9	-	UCC 101-10	-	UCC 101-11	-	UCC 101-12	-	UCC 101-13	-	UCC 101-14	-	UCC 101-15	-	UCC 101-16	-	UCC 101-17	-	UCC 101-18	-	UCC 101-19	-	UCC 101-20	-	UCC 101-21	-	UCC 101-22	-	UCC 101-23	-	UCC 94-2	-	UCC 94-1	-	UCC 101-24	-	UCC 101-25	-	UCC 94-A	-	UCC 101-26	-	UCC 101-27	-	UCC 101-28	-	UCC 101-29	-

Appendix 8.--Fauna distribution chart, Willapa River section--continued.

Part 13E

184. <u>Catapsydrax</u> cf. <u>C. unicus</u> Bolli,	UCC 101-7	UCC 93-2	UCC 101-8	UCC 93-1	UCC 101-9	UCC 101-10	UCC 101-11	UCC 101-12	UCC 101-13	UCC 101-14	UCC 101-15	UCC 101-16	UCC 101-17	UCC 101-18	UCC 101-19	UCC 101-20	UCC 101-21	UCC 101-22	UCC 101-23	UCC 94-2	UCC 94-1	UCC 101-24	UCC 101-25	UCC 94-A	UCC 101-26	UCC 101-27	UCC 101-28	UCC 101-29			
Loeblich, and Tappan -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
185. <u>Globigerina praebulloides</u> Blow -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
186. <u>Globigerina ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
187. <u>Globigerina euapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
188. <u>Globigerina</u> cf. <u>G. pseudovenezuelana</u> Blow and Banner -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
189. <u>Globigerina galavisi</u> Bermudez -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
190. <u>Catapsydrax dissimilis</u> (Cushman and Bermudez) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
191. <u>Globigerina</u> cf. <u>G. ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
ASSOCIATED ORGANISMS																															
192. Diatoms -----	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	F	-	-	F	-	-	F	F	F	F		
193. Fish debris -----	-	R	-	R	F	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-		
194. Geodites -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
195. Ostracods -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
196. Radiolarians -----	F	-	-	F	F	-	-	-	-	-	-	-	-	R	-	-	-	-	F	-	-	-	R	F	-	F	F	F	-	F	

Appendix 8.--Faunal distribution chart, Willapa River section--Continued.

Part 2F

16.	<u>Eggerella subconica</u> Parr -----	UOC 101-30	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
17.	<u>Fursenkoia bramletti</u> (Galloway and Morrey) -----	UOC 96-5	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
18.	<u>Lagena semistriata</u> Williamson -----	UOC 101-34	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
19.	<u>Lenticulina</u> spp. -----	UOC 101-33	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
20.	<u>Lenticulina welchi</u> Church -----	UOC 101-32	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
21.	<u>Planularia tolmanni</u> Cushman and Simonson -----	UOC 101-31	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
22.	<u>Stilostomella adolphina</u> (d'Orbigny) -----	UOC 81-1	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
23.	<u>Valvulineria jacksonensis welcomensis</u> Mallory -----	UOC 81-2	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
24.	<u>Bolivina gardnerae</u> Cushman -----	UOC 101-30	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
25.	<u>Bolivina hunneri</u> Howe -----	UOC 81-1	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
26.	<u>Bolivina scabrata</u> Cushman and Bermudez -----	UOC 81-2	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
27.	<u>Globobulimina pacifica</u> Cushman -----	UOC 101-31	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
28.	<u>Guttulina</u> spp. -----	UOC 101-32	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
29.	<u>Nonionellina applini</u> (Howe and Wallace) -----	UOC 101-33	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
30.	<u>Orthomorphina rohri</u> (Cushman and Stainforth) -----	UOC 101-34	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25
31.	<u>Plectofrondicularia packardi</u> Cushman and Schenck -	UOC 101-30	-	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25

Appendix 8.--Fauna distribution chart, Willapa River section--continued.

Part 13F

184. <u>Catapsydrax</u> cf. <u>C. unicus</u> Bolli, Loeblich, and Tappan -----	UOC 101-30	UOC 81-2	UOC 81-1	UOC 101-31	UOC 101-32	UOC 96-5	UOC 101-33	UOC 101-34	UOC 76-35	UOC 76-34	UOC 98-1	UOC 98-2	UOC 76-33	UOC 98-3	UOC 96-1	UOC 96-4	UOC 98-4	UOC 76-32	UOC 98-5	UOC 96-2	UOC 76-31	UOC 96-3	UOC 76-30	UOC 76-29	UOC 76-28	UOC 76-27	UOC 76-26	UOC 76-25			
185. <u>Globigerina praebulloides</u> Blow -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
186. <u>Globigerina ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
187. <u>Globigerina euapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
188. <u>Globigerina</u> cf. <u>G. pseudovenezuelana</u> Blow and Banner -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
189. <u>Globigerina galavisi</u> Bermudez -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
190. <u>Catapsydrax dissimilis</u> (Cushman and Bermudez) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
191. <u>Globigerina</u> cf. <u>G. ampliapertura</u> Bolli -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
ASSOCIATED ORGANISMS																															
192. Diatoms -----	F	-	F	R	-	R	R	-	F	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	F	
193. Fish debris -----	-	-	R	-	R	-	-	-	-	-	R	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	R	-	
194. Geodites -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
195. Ostracods -----	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
196. Radiolarians -----	-	-	F	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	R	R	R	F	R		

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 2G

16. <u>Eggerella subconica</u> Parr -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
17. <u>Fursenkoina bramletti</u> (Galloway and Morrey) -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
18. <u>Lagena semistriata</u> Williamson -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	R	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
19. <u>Lenticulina</u> spp. -----	UCC 76-24	-	UCC 76-20	R	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	R	UCC 76-12	F	UCC 76-11	F	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	R	UCC 76-2	R	UCC 76-1	-
20. <u>Lenticulina weichi</u> Church -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
21. <u>Planularia tolmani</u> Cushman and Simonson -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	R	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
22. <u>Stilostomella adolphina</u> (d'Orbigny) -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
23. <u>Valvulineria jacksonensis welcomensis</u> Mallory -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
24. <u>Bolivina gardnerae</u> Cushman -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
25. <u>Bolivina hunneri</u> Howe -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
26. <u>Bolivina scabrata</u> Cushman and Bermudez -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
27. <u>Globobulimina pacifica</u> Cushman -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	R	UCC 76-18	C	UCC 76-17	F	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
28. <u>Guttulina</u> spp. -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
29. <u>Nonionellina applini</u> (Howe and Wallace) -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	R	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
30. <u>Orthomorphina rohri</u> (Cushman and Stainforth) -----	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-
31. <u>Plectofrondicularia packardii</u> Cushman and Schenck -	UCC 76-24	-	UCC 76-20	-	UCC 76-19	-	UCC 76-18	-	UCC 76-17	-	UCC 76-16	-	UCC 76-15	-	UCC 76-14	-	UCC 76-13	-	UCC 76-12	-	UCC 76-11	-	UCC 76-10	-	UCC 76-9	-	UCC 76-8	-	UCC 76-7	-	UCC 76-6	-	UCC 76-5	-	UCC 76-4	-	UCC 76-3	-	UCC 76-2	-	UCC 76-1	-

Appendix 8.--Faunal distribution chart, Willapa River section--continued.

Part 4G

48. <u>Spiroloculina texana</u> Cushman and Ellis	UOC 76-24	-	UOC 76-24	-
49. <u>Bolivina kleinpelli</u> Beck	UOC 76-19	-	UOC 76-19	-
50. <u>Cyclammina pacifica</u> Beck	UOC 76-24	A	UOC 76-24	F
51. <u>Lagena costata</u> (Williamson)	UOC 76-22	-	UOC 76-22	R
52. <u>Lenticulina limbosa hockleyensis</u>	UOC 76-24	-	UOC 76-24	-
Cushman and Applin	UOC 76-22	-	UOC 76-22	F
53. <u>Lenticulina lincolnensis</u> (Rau)	UOC 76-16	-	UOC 76-16	F
54. <u>Lenticulina</u> sp. A	UOC 76-24	-	UOC 76-24	-
55. <u>Marginulina adunca</u> (Costa)	UOC 76-24	-	UOC 76-24	-
56. <u>Allomorphina trigona</u> Reuss	UOC 76-24	-	UOC 76-24	-
57. <u>Amphimorphina jenkinsi</u> (Church)	UOC 76-24	-	UOC 76-24	-
58. <u>Præglobbulimina pupoides</u> (d'Orbigny)	UOC 76-12	-	UOC 76-12	R
59. <u>Cyclogyra byramensis</u> (Cushman)	UOC 76-24	-	UOC 76-24	-
60. <u>Gyroidina orbicularis planata</u> Cushman	UOC 76-24	F	UOC 76-24	-
61. <u>Nodosaria pyrula</u> d'Orbigny	UOC 76-18	-	UOC 76-18	F
62. <u>Nonionella jacksonensis</u> Cushman	UOC 76-12	-	UOC 76-12	R

Appendix 8.--Fauna distribution chart, Willapa River section--Continued.

Part 9G

	UOC 76-24	UOC 76-23	UOC 76-22	UOC 76-21	UOC 76-20	UOC 76-19	UOC 76-18	UOC 76-17	UOC 76-16	UOC 76-15	UOC 76-14	UOC 76-13	UOC 76-12	UOC 76-11	UOC 76-10	UOC 76-9	UOC 76-8	UOC 76-7	UOC 76-6	UOC 76-5	UOC 76-4	UOC 76-3	UOC 76-2	UOC 76-1
125. <u>Plectrofrondicularia oregonensis</u> Cushman, Stewart, and Stewart -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
126. <u>Stilostomella lepidula</u> (Schwager) -----	-	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-	-	-	-	F	-	-	-	-
127. <u>Lenticulina texana</u> (Cushman and Applin) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
128. <u>Bolivina jacksonensis striatella</u> Cushman and Applin -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
129. <u>Martinottiella communis</u> (d'Orbigny) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
130. <u>Biloculina cowlitzensis</u> Beck -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
131. <u>Pseudonodosaria conica</u> (Neugeboren) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
132. <u>Globulina</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	R	F	-	-	-	-	-	-	-	-	-	-	-
133. <u>Dentalina communis</u> (d'Orbigny) -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
134. <u>Lagena vulgaris</u> Williamson -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135. <u>Cassidulina galvinensis</u> Cushman and Frizell -----	F	F	-	-	-	-	R	-	-	R	F	F	R	F	-	-	-	-	-	-	F	-	C	C
136. <u>Haplophragmoides</u> sp. -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
137. <u>Valvulineria willapaensis</u> Rau -----	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
138. <u>Bulimina alsatica</u> Cushman and Parker -----	-	-	-	-	-	-	-	-	-	-	-	-	F	R	-	F	-	-	-	-	F	-	F	F

184. <u>Catapsydrax</u> cf. <u>C. unicus</u> Bolli, Loeblich, and Tappan -----	UOC 76-24	-	UOC 76-23	UOC 76-22	UOC 76-21	UOC 76-20	UOC 76-19	UOC 76-18	UOC 76-17	UOC 76-16	UOC 76-15	UOC 76-14	UOC 76-13	UOC 76-12	UOC 76-11	UOC 76-10	UOC 76-9	UOC 76-8	UOC 76-7	UOC 76-6	UOC 76-5	UOC 76-4	UOC 76-3	UOC 76-2	UOC 76-1		
185. <u>Globigerina praebulloides</u> Blow -----	UOC 76-24	-	UOC 76-23	F	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	F	UOC 76-2	-	
186. <u>Globigerina ampliapertura</u> Bolli -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	F	UOC 76-11	R	UOC 76-9	-	UOC 76-8	-	UOC 76-6	F	UOC 76-4	-	UOC 76-2	F	
187. <u>Globigerina euapertura</u> Bolli -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	F	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	F	
188. <u>Globigerina</u> cf. <u>G. pseudovenezuelana</u> Blow and Banner -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	-	
189. <u>Globigerina galavisi</u> Bermudez -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	-	
190. <u>Catapsydrax dissimilis</u> (Cushman and Bermudez) -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	F	UOC 76-2	-	
191. <u>Globigerina</u> cf. <u>G. ampliapertura</u> Bolli -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	R	
ASSOCIATED ORGANISMS																											
192. Diatoms -----	UOC 76-24	-	UOC 76-23	F	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	F	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	F	UOC 76-4	-	UOC 76-2	F	
193. Fish debris -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	R	UOC 76-19	-	UOC 76-17	-	UOC 76-15	R	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	-	
194. Geodites -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	-	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	-	
195. Ostracods -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	-	UOC 76-15	R	UOC 76-13	-	UOC 76-11	R	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	R	
196. Radiolarians -----	UOC 76-24	-	UOC 76-23	-	UOC 76-21	-	UOC 76-19	-	UOC 76-17	F	UOC 76-15	-	UOC 76-13	-	UOC 76-11	-	UOC 76-9	-	UOC 76-8	-	UOC 76-6	-	UOC 76-4	-	UOC 76-2	-	

Appendix 9. Faunal distribution chart, Beaver Creek section.

[A = abundant (>50 specimens); C = common (20-50 specimens);

F = few (2-19 specimens); R = rare (< 1 specimen); ? = questionable occurrence.]

	KAM 271	KAM 272	KAM 273	KAM 274	KAM 275	KAM 277	KAM 276
BENTHIC FORAMINIFERA							
1. <u>Bathysiphon eocenica</u> Cushman and Hanna -----	F	F	-	F	-	-	R
2. <u>Bathysiphon</u> sp. B -----	F	-	-	-	-	-	-
3. <u>Budashevaella</u> cf. <u>B. multicameratus</u> (Voloshinova) -----	F	-	-	-	-	-	-
4. <u>Cyclamina pacifica</u> Beck -----	A	C	-	-	-	-	A
5. ? <u>Eggerella subconica</u> Parr -----	F	R	-	-	-	-	A
6. <u>Eggerella elongata</u> Blaisdell -----	F	-	-	-	-	-	-
7. <u>Martinottiella communis</u> (d'Orbigny) -----	A	C	-	-	-	-	-
8. <u>Trochammina globigeriniformis</u> (Parker and Jones) -----	C	C	-	A	-	-	-
9. <u>Bathysiphon</u> spp. -----	-	F	-	-	-	-	R
10. <u>Cyclamina</u> spp. -----	-	-	R	-	-	-	-
ASSOCIATED ORGANISMS							
11. Molds -----	F	-	F	-	-	-	-
12. Arenaceous unknowns -----	F	F	-	-	-	-	F
13. <u>Diatoms - pyrite</u> -----	F	-	-	-	-	-	-
14. Radiolarians -----	R	R	-	-	-	-	-
15. Sponge spicules -----	R	-	-	-	-	-	-
16. Fish debris -----	R	-	-	-	-	-	-
17. Megafossil fragments -----	-	-	F	?	-	-	-