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Tertiary Foraminiferal Localities in the Cape Flattery Area,
Northwestern Olympic Peninsula, Washington

P. D. Snavely, Jr.¹, W. W. Rau², and D. J. Hafley¹

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

1. U.S. Geological Survey,
Menlo Park, California

2. Washington State Division of
Geology and Earth Resources,
Olympia, Washington

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by

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The biostratigraphic framework for the Tertiary strata mapped by Snavely and others (1986) in the Clallam Bay, Cape Flattery, Lake Pleasant, and Ozette Lake 15-minute quadrangles is based chiefly upon age determinations made by Rau (see Snavely and others, 1980) from his study of foraminifers. Although these mainly bathyal Tertiary sedimentary rocks generally contain sparse foraminifers, they indicate that the rocks range in age from early Eocene to early Miocene. Most of the samples were collected along river beds or in logging road cuts where the rocks are the least weathered. Nevertheless, most of the samples collected south of the Crescent Thrust Fault were barren, as these strata are structurally complex and have suffered secondary alteration.

The foraminiferal slides prepared by Rau for this area are part of the U.S. Geological Survey, Pacific Northwest Foraminiferal Reference Collection which presently is housed in the Division of Geology and Earth Resources, Olympia, Washington. Rau's assignments of foraminiferal assemblages to Eocene stages of Mallory (1959), Eocene and Oligocene stages of Schenck and Kleinpell (1936), and Oligocene and Miocene stages of Kleinpell (1938) are contained in published and written communications during the period 1969 to 1985.

Tables list the field and reference collection number for each sample and sample location by latitude and longitude. The tables are grouped under the new 1984 U.S. Geological Survey 7-1/2-minute quadrangles; the relationship of these quadrangles to the old 1956 and 1957, 15-minute quadrangles is indicated. The age and/or foraminiferal stage assignments by Weldon Rau are shown as well as the reliability of each age determination (call). Symbols listed under "call" are: G, good; F, fair; ?, questionable. The depositional environments (paleoenvironments) indicated by the foraminiferal assemblages are presented for most samples.

1. U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California
2. Washington State Division of Geology and Earth Resources, Olympia, Washington

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- _____, Niem, A. R., MacLeod N. S., Pearl, J. E., and Rau, W. W., 1980, Makah Formation--A deep-marginal-basin sequence of late Eocene and Oligocene age in the northwestern Olympic Peninsula, Washington: U.S. Geological Survey Professional Paper 1162-B, 28 p.

Table 1.--Locations and ages of foraminiferal collections in the Clallam Bay 15' Quadrangle (includes the Sekiu River and Clallam Bay 7-1/2' Quadrangles).

Sekiu River 7-1/2' Quadrangle

Key:
e. - early
l. - late
prob. - probably
poss. - possibly

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
GSCB70-4	5191	124 23.93'	48 17.50'	1. Refugian-Zemorian	F/?	-	
GSCB70-5	5192	124 26.63'	48 18.83'	Zemorian	?	-	possibly 1. Refugian
MCF70-29	5048	124 29.49'	48 20.05'	Oligocene?	?	-	Refugian or Zemorian
MR71-75	5311	124 27.38'	48 15.57'	Zemorian?	?	-	very poorly preserved
MR71-132	5365	124 23.66'	48 17.26'	Zemorian	G	prob. middle to outer shelf	firm Zemorian age
MR71-133	5366	124 24.31'	48 17.00'	Zemorian	F	prob. upper bathyal	
MR71-135a	5367	124 25.84'	48 16.83'	Zemorian?	?	prob. upper bathyal	small, poor assemblage
MR71-135b	5368	124 25.84'	48 16.83'	Zemorian?	?	prob. upper bathyal	small, non-diag. assem.
MR71-135c	5369	124 25.84'	48 16.83'	Oligocene?	?	prob. "fairly deep water"	
MR71-136	5320	124 26.90'	48 16.62'	Narizian-e. Refugian?	?	-	small, non-diag. assem.
MR71-136B	5418	124 26.90'	48 16.62'	1. Narizian-e. Refugian	F	bathyal or abyssal	e. Refugian?
MR71-137	5370	124 27.36'	48 16.77'	Refugian or Zemorian	F/?	cold water, upper bathyal or deeper	
MR71-142	5419	124 26.48'	48 17.91'	Refugian or Zemorian	?	-	very meager assem.
MR71-144	5371	124 26.93'	48 17.24'	Refugian	F	middle shelf-upper bathyal	
MR71-148b	5372	124 28.80'	48 16.66'	Refugian	?	-	meager assemblage
MR71-151	5373	124 29.14'	48 16.49'	middle Eocene	?	middle bathyal to abyssal	
MR71-152	5321	124 29.51'	48 16.47'	Narizian	F	-	poss. Ulatisian
MR71-154	5374	124 28.70'	48 16.65'	middle Eocene	?	cold water, middle bathyal-abyssal	
MR71-157	5375	124 28.57'	48 16.13'	1. Narizian-e. Refugian	F/?	cold water, outer shelf-upper bathyal	
MR71-232a	5422	124 22.84'	48 17.10'	Zemorian	G	bathyal, perhaps lower	distinct Zemorian
MR71-232b	5423	124 22.84'	48 17.10'	Zemorian?	F/?	poss. deep water	
MR71-235	5441	124 25.60'	48 18.38'	Refugian?	F/?	-	poss. Zemorian
MR71-236a	5425	124 25.42'	48 18.30'	1. Refugian-Zemorian	F/?	middle to upper bathyal	
MR71-236b	5424	124 25.36'	48 18.30'	Zemorian?	F	cold water, middle-upper bathyal	
MR71-238	5427	124 27.43'	48 19.23'	1. Refugian-e. Zemorian	F	lower neritic to u.-m. bathyal	
SR71-112	5383	124 28.07'	48 15.99'	1. Eocene-Oligocene?	?	bathyal or deeper	very meager assem.
SR71-113	7336	124 27.88'	48 15.85'	1. Eocene-Oligocene	?	lower neritic or upper bathyal	
SR71-114	5384	124 27.95'	48 15.62'	1. Narizian	G	outer shelf-upper bathyal	small, diag. assem.
MR72-82	5650	124 28.48'	48 16.90'	Narizian	F	middle-lower? neritic	1. Narizian?
MR72-83	5724	124 28.55'	48 16.96'	Narizian	F	prob. upper bathyal	
MR72-85	5725	124 28.30'	48 16.99'	1. Narizian-Refugian	F	cold water, "substantial depths"	
MR72-143	5997	124 26.66'	48 18.86'	1. Refugian-e. Zemorian	G	prob. middle-lower bathyal	
MR72-207	6006	124 27.92'	48 15.04'	1. Ulatisian-e. Narizian	F	prob. outer shelf-upper bathyal	near R-Z boundary
MR72-209	5733	124 28.06'	48 15.42'	e. Narizian	G	prob. lower bathyal-upper abyssal	
SR72-37	5692	124 23.94'	48 17.50'	Zemorian	G	cold water, prob. upper bathyal	diagnostic Zemorian
SR72-60	5693	124 28.75'	48 16.56'	Narizian?	F	poss. cold water	very small assem.
SR72-63	5694	124 28.87'	48 16.33'	Narizian	F	-	prob. e. Narizian
SR72-64	5647	124 28.67'	48 16.18'	1. Ulatisian	G/F	middle-upper bathyal	
M73-9	7239	124 28.79'	48 15.87'	Ulatisian	F	outer sublittoral to littoral	Amphistegina fauna
M73-88	7001	124 28.99'	48 16.12'	e. Narizian?	?	-	middle to e.-l. Eocene

Table 1.--(Sekiu River 7-1/2' Quadrangle - Continued)

M73-89	7002	124 29.25'	48 15.97'	Ulatisian	G	warm water, reef conditions	prob. e.Ulatisian
M73-89a	7003	124 29.25'	48 15.97'	Ulatisian	G	warm water, reef conditions	prob. 1.Ulatisian
M73-91	7004	124 28.99'	48 15.61'	Ulatisian?	?	-	Ulatisian-e.Narizian
M73-92	7005	124 28.96'	48 15.68'	Ulatisian?	?	-	Ulatisian-e.Narizian
M73-93	7006	124 28.94'	48 15.71'	Ulatisian	F	cold, outer sublitt- upper bathyal	
M73-95	7039	124 28.90'	48 15.81'	e. Narizian	F	probably bathyal	
M73-96	7007	124 29.01'	48 17.07'	Narizian?	?	-	
M73-101	7035	124 28.94'	48 16.01'	e.Narizian	G	probably bathyal	Eocene age suggested
M73-102	7040	124 29.72'	48 16.38'	Ulatisian	F	prob. inner sublittoral	poss. 1.Ulatisian
M73-107	7010	124 28.54'	48 16.00'	e.Narizian	G/F	outer sublittoral-upper bathyal	prob. 1.Ulatisian
M73-109	7011	124 28.48'	48 15.93'	e.Narizian	F	prob. outer sublittoral-bathyal	
M73-145	7189	124 28.18'	48 17.61'	Refugian-e.Zemorrian	F	middle shelf or inner sublitt.	
MR73-91	7020	124 28.99'	48 15.61'	Ulatisian?	?	-	poss. e.Narizian
P73-23	7052	124 24.47'	48 16.30'	Zemorrian?	?	bathyal or outer shelf	
S73-19	7081	124 29.71'	48 16.36'	e.Narizian	F/?	outer sublittoral or shallower	
S73-21	7042	124 29.65'	48 16.11'	Ulatisian	G	shallow, warm water	<u>Amphistegina californica</u>
S73-22	7124	124 29.22'	48 15.97'	e.Narizian	F	inner sublittoral	poss. 1.Ulatisian
S73-24	7043	124 29.18'	48 16.14'	e.Narizian	F	outer shelf-bathyal	
S73-24a	7013	124 29.18'	48 16.14'	1.Ulatisian	G	inner sublittoral or littoral	typical 1.Ulatisian
S73-24b	7082	124 29.18'	48 16.14'	Ulatisian	G	reef-like conditions	good Ulat. assemblage
S73-25	7014	124 29.18'	48 16.14'	e.Narizian	F	outer sublittoral-upper bathyal	poss.Ulatisian
S73-26	7015	124 29.10'	48 16.25'	e.Narizian	F	bathyal depths	
S73-27	7044	124 29.09'	48 16.26'	Ulatisian	F/?	-	
S73-28	7016	124 29.04'	48 16.33'	e.Narizian	G	outer sublittoral to bathyal	
S73-68	6087	124 29.15'	48 16.17'	Ulatisian	F	fairly deep, cool water	poss. e.Narizian
S73-69b	7045	124 28.91'	48 16.45'	e.Narizian?	?	probably bathyal	
S73-69c	7046	124 28.91'	48 16.45'	e.Narizian?	?	probably bathyal	
S73-70	7047	124 29.01'	48 16.36'	e.Nariz or older	?	probably bathyal	
S73-59	7804	124 27.05'	48 16.41'	Narizian	F	probably bathyal	
S73-72	7733	124 27.03'	48 16.17'	Narizian	G/F	cold water, middle bathyal?	
S73-73	7693	124 26.97'	48 16.60'	Refugian or Zemorrian	F	bathyal conditions	confusing assemblage
S73-81	7786	124 28.08'	48 15.82'	Narizian or Refugian	F	no less than upper bathyal	very small assemblage
S73-82	7715	124 28.05'	48 15.71'	1.Ulatisian-e.Narizian	F	probably bathyal	poss.earliest Nariz.
S73-138	7788	124 27.88'	48 15.20'	Ulatisian	F	probably bathyal	
S77-51	8180	124 27.23'	48 19.12'	Zemorrian	F	outer shelf	
S77-52	8181	124 27.60'	48 19.28'	Refugian	G	cool water, middle-inner shelf	characteristic Refug.
N78-2	8434	124 25.14'	48 16.31'	Refugian	F	middle or upper bathyal	poss. Narizian
N78-3	8441	124 25.16'	48 16.29'	1.Narizian	G	probably bathyal	
N78-3r	8439	124 25.16'	48 16.29'	Refugian-Zemorrian	?	probably shallow water	fragments only
S78-99	8417	124 27.00'	48 17.27'	Narizian	F	cold water, bathyal	
S78-116	8551	124 25.43'	48 15.11'	Narizian	F	no less than upper bathyal	
S78-185	8438	124 28.44'	48 18.02'	Refugian	?	-	single specimen call
S79-124	8627	124 28.73'	48 15.46'	Ulatisian	G	warm, shallow water	<u>Amphistegina californica</u>
S82-101	9008	124 23.63'	48 17.25'	Zemorrian	G	bathyal, prob. upper	
S82-109	9009	124 23.63'	48 17.25'	Zemorrian	G	bathyal, prob. upper	
S82-115	9010	124 23.63'	48 17.25'	Zemorrian	G	bathyal, prob. upper	
S82-122	9011	124 23.63'	48 17.25'	Zemorrian	G	bathyal, prob. upper	
S82-137	9012	124 23.63'	48 17.25'	Zemorrian	G	bathyal, prob. upper	
S82-149	9013	124 23.63'	48 17.25'	Zemorrian	G	bathyal, prob. upper	
S82-150	9014	124 23.63'	48 17.25'	Zemorrian	G	bathyal, prob. upper	

Table 1.--(Clallam Bay 7-1/2' Quadrangle - Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
GBS70-1	5182	124 21.17'	48 15.57'	Refugian or Zemorrian	F	-	
GBS70-16	5186	124 21.89'	48 15.12'	Zemorrian?	F/?	-	1. Refugian-Zemorrian
GBS70-18	5187	124 21.03'	48 15.51'	Zemorrian	F	-	
GSCB70-3	5190	124 18.51'	48 15.65'	1. Zemorrian	G	-	excellent assemblage
MR1-124a	5319	124 16.66'	48 15.33'	Zemorrian	F	-	
MR1-124b	5282	124 16.66'	48 15.33'	Zemorrian?	?		
MR1-124c	5582	124 16.66'	48 15.33'	Zemorrian	G	upper bathyal at least	1. ?Zemorrian
MR1-185	5323	124 16.89'	48 15.37'	Zemorrian	F	-	
MR1-186	5324	124 16.82'	48 15.18'	Zemorrian	F	-	
MR1-206	5539	124 17.85'	48 16.00'	1. Refugian-Zemorrian	?		
MR1-292	5382	124 17.85'	48 16.00'	Zemorrian	F		
PR1-8	5545	124 19.22'	48 16.34'	Zemorrian	G	bathyal water depth	
MR12-101	5726	124 21.53'	48 15.12'	Zemorrian, poss. Refugian	F/?	lower neritic-upper bathyal	diagnostic assem.
PR12-43	5735	124 19.96'	48 15.06'	Refugian or Zemorrian	F	no deeper than bathyal	
S73-33	7017	124 20.61'	48 16.82'	1. Zemorrian	G	prob. middle to lower bathyal	
S74-35	7331	124 15.03'	48 15.81'	Saucesian	G/F	outer shelf	poss. e. Saucesian
S75-22	7689	124 20.91'	48 16.84'	Zemorrian	G	inner sublittoral or shallower	diagnostic frags
S75-23	7609	124 20.91'	48 16.50'	Zemorrian	F	upper to middle bathyal	probably 1. Zemor
S75-225	7739	124 16.25'	48 15.24'	Zemorrian	F	upper to middle bathyal	
S77-53	8182	124 20.70'	48 16.07'	Zemorrian	G	prob. outer shelf-upper bathyal	probably 1. Zemor
S77-73a	8244	124 18.53'	48 16.08'	Zemorrian	F	cold water, outer shelf	
S77-73b	8245	124 18.53'	48 16.08'	Zemorrian	F	prob. outer shelf	
S80-89	8200	124 16.68'	48 15.33'	Zemorrian	F	prob. upper bathyal	good Zemorrian age
PHA-1	5783	124 21.04'	48 15.78'	1. Refugian-e. Zemorrian	G	cold water, bathyal depths	
PHA-2	5784	124 21.04'	48 15.78'	Zemorrian	F	lower neritic-upper bathyal	prob. 1. Ref-e. Zemor
PHA-5a	5785	124 21.12'	48 15.63'	Refugian or Zemorrian	F/?	middle to upper bathyal	Zemorrian?
PHA-5b	5786	124 21.13'	48 15.62'	Zemorrian	F	prob. upper bathyal	possibly Refugian
PHA-6	5787	124 21.35'	48 15.53'	Zemorrian	F	prob. upper bathyal	
PHA-8	5788	124 21.67'	48 15.58'	Zemorrian	F	prob. upper bathyal	
PHA-9	5789	124 21.69'	48 15.57'	Zemorrian	G	lower neritic-upper bathyal	
PHA-11	5790	124 21.79'	48 15.51'	Refugian or Zemorrian	F/?	bathyal, perhaps upper	Zemorrian?
PHA-12	5791	124 21.90'	48 15.38'	Refugian or Zemorrian	F	upper bathyal	
PHB-2	5792	124 22.32'	48 15.08'	Zemorrian	F/?	middle to upper bathyal	
PHC-2	7190	124 21.03'	48 15.51'	Zemorrian	F	probably shelf	
PHC-3	7258	124 20.99'	48 15.44'	1. Narizian-e. Refugian	F	upper bathyal-outer shelf	small, diagnostic assem.
PHC-5	7191	124 21.10'	48 15.37'	Zemorrian	G	prob. outer sublittoral	e. Zemorrian?
PHC-6	7192	124 21.16'	48 15.36'	Zemorrian	G	outer sublittoral	1. Zemorrian?
PHC-7	7193	124 21.26'	48 15.35'	Zemorrian	F	prob. outer sublittoral	
PHC-8	7194	124 21.35'	48 15.38'	Zemorrian	F	prob. outer sublittoral	1. Refugian-e. Zemorrian
PHC-9	7195	124 21.56'	48 15.41'	Refugian-Zemorrian	F/?	prob. outer sublittoral	

Table 2.--Locations and ages of foraminiferal collections in the Cape Flattery 15' Quadrangle
(includes the Waadah Island, Cape Flattery, Neah Bay, and Makah Bay 7-1/2' Quadrangles).

Waadah Island 7-1/2' Quadrangle

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Cal	Paleoenvironment	Remarks
MCF70-19	5043	124 35. 70'	48 22. 73'	Narizian or Ulatisian	-	-	
N73-2	7132	124 35. 98'	48 22. 65'	1.Narizian-e.Refugian	-	-	
N73-4	7133	124 35. 93'	48 22. 62'	Zemorrian	-	-	
N73-5	7247	124 35. 93'	48 22. 68'	1.Narizian	-	-	
N73-6	7134	124 35. 93'	48 22. 68'	1.Narizian	-	-	
N73-10	7250	124 35. 83'	48 22. 62'	Narizian	-	-	
N73-12	7135	124 35. 83'	48 22. 69'	1. Eocene-Oligocene	?	outer shelf or upper bathyal	
N73-13	7251	124 35. 89'	48 22. 86'	1.Narizian	-	-	
N73-14	7136	124 35. 87'	48 22. 86'	Refugian	F/?	outer shelf to upper bathyal	
N73-15	8276	124 36. 01'	48 22. 65'	Ulatisian or e.Narizian	F	mid to upper bathyal	
N73-16	8243	124 35. 96'	48 22. 63'	Ulatisian or e.Narizian	F/?	cold water,bathyal	
N73-17	8321	124 35. 89'	48 22. 64'	Narizian-Refugian	F/?	outer shelf-upper bathyal	
N73-19	8330	124 35. 76'	48 22. 67'	Narizian	F	cold water,bathyal	
N73-21	8322	124 35. 78'	48 22. 72'	Refugian or Zemorrian	F/?	prob.outer shelf	
N73-22	8277	124 35. 74'	48 22. 73'	1.Narizian	F	cold water,outer shelf	
N73-23	8278	124 35. 68'	48 22. 73'	Refugian	G	outer shelf-upper bathyal	

Table 2.--(Cape Flattery 7-1/2' Quadrangle - Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
MCF70-16	5041	124 39.38'	48 23.45'	Refugian or Zemorrian	F	-	small assem, prob Zemor.
MCF70-17	5042	124 39.11'	48 23.44'	probably Refugian	?	deep water conditions	meager assemblage
MCF70-23	5006	124 38.34'	48 22.63'	Refugian	F	-	
MCF70-24	5007	124 38.47'	48 23.20'	e.Refugian	F	-	poss. l.Narizian
MCF70-51	5134	124 40.74'	48 23.36'	Narizian-Refugian	F	-	
MCF70-52	5135	124 40.65'	48 23.43'	Narizian or e.Refugian	F/?	-	very meager assemblage
MCF70-55	5136	124 40.01'	48 23.31'	Narizian?	?	-	poor assemblage
MCF70-56	5137	124 39.87'	48 23.32'	Narizian?	?	-	very poor, Eocene?
MCF70-57	5138	124 39.82'	48 23.33'	l.Narizian-Refugian?	?	-	small, non-diagnostic
MCF70-58	5139	124 39.63'	48 23.38'	Narizian, poss. Refugian	?	-	prob. l. Eocene age
MCF70-60	5140	124 39.53'	48 23.44'	Refugian	G	-	prob. l. Refugian
MCF70-62	5141	124 39.20'	48 23.40'	Refugian	F	-	
MCF70-63	5142	124 39.14'	48 23.42'	l. Ulatisian-e. Narizian	G	-	
MCF70-64	5143	124 39.08'	48 23.46'	l. Refugian-e. Zemorrian	F	-	
MCF70-66	5144	124 38.91'	48 23.37'	Refugian-e. Zemorrian	F	-	
MCF70-67	5145	124 38.77'	48 23.33'	Refugian, prob. e.	G	-	
MCF70-68	5146	124 38.67'	48 23.31'	Refugian	F	-	
MCF70-69	5147	124 38.55'	48 23.31'	Refugian or Zemorrian	?	-	mixed assemblage
MCF70-70	5148	124 38.41'	48 23.31'	Refugian	F	-	
MCF70-71	5149	124 38.32'	48 23.30'	Refugian	F	-	
MCF70-72	5150	124 38.24'	48 23.29'	e. Refugian	G	-	excellent assemblage
MCF70-73	5151	124 38.14'	48 23.29'	Refugian?	?	-	l. Narizian-Refugian
MCF70-73 (2)	5152	124 38.15'	48 23.29'	e. Refugian	G	-	
MCF70-74	5153	124 38.15'	48 23.26'	Refugian	F	-	
MCF70-75	5154	124 38.05'	48 22.86'	Refugian	F	-	
MCF70-76	5155	124 38.15'	48 22.86'	l. Narizian-e. Refugian	F	-	
MR72-25	5122	124 38.15'	48 23.25'	Refugian	G	poss. bathyal	small, diag. assem
M73-136	7188	124 38.18'	48 23.17'	Zemorrian or Refugian	F	no deeper than outer shelf	
S74-4	7318	124 40.18'	48 23.19'	l. Narizian	G	-	l. Narizian-e. Refugian
S74-15	7319	124 39.75'	48 23.33'	Refugian, prob. e.	G	-	typical e. Refugian fauna
S74-20	7320	124 39.45'	48 23.46'	Refugian, prob. l.	G	-	excellent assemblage
S74-22	7321	124 39.44'	48 23.48'	Refugian	F	-	poss. e. Narizian
S74-26	7322	124 38.45'	48 23.36'	Narizian	G/F	prob. shelf environment	
S74-27	7323	124 38.68'	48 23.42'	Refugian?	F	poss. outer shelf-upper slope	
S74-28	7328	124 38.80'	48 23.39'	Refugian?	?	-	very meager assemblage
S74-30	7329	124 39.20'	48 23.40'	Refugian?	?	-	very meager assemblage
S75-60	7652	124 39.33'	48 23.44'	Narizian	G	outer shelf-upper bathyal	latest Nariz, e. Refug.
S75-61	7711	124 39.97'	48 23.34'	Eocene?	?	-	
S75-63	7690	124 39.78'	48 23.35'	Narizian	?	prob. bathyal conditions	very meager assemblage
S75-64	7631	124 39.84'	48 22.57'	Narizian?	?	deep, cold water cond.	

Table 2.--(Neah Bay 7-1/2' Quadrangle - Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
MCF70-28	5044	124 32.87'	48 21.78'	1.Refugian	-	-	
MCF70-28	5045	124 32.87'	48 21.78'	1.Refugian	-	-	
MCF70-28	5046	124 32.87'	48 21.78'	1.Refugian	-	-	
MCF70-28	5047	124 32.87'	48 21.78'	1.Refugian	-	-	
MCF70-75a	5057	124 31.47'	48 16.34'	Ulatisian	G	-	
MCF70-30	5009	124 33.31'	48 21.53'	Refug or e.Zemor	F	-	unequivocal mid.Eocene
MCF70-32	5010	124 31.21'	48 20.84'	Refugian	F	-	
MCF70-33	5011	124 30.54'	48 20.57'	Refugian	F	-	possibly Ulatisian
MCF70-78	5156	124 34.98'	48 22.36'	Narizian or Refug.	F	-	
MCF70-80	5157	124 35.04'	48 22.29'	Narizian or Refug.	F	-	
MCF70-84	5158	124 35.07'	48 19.70'	Refugian-Zemorrian	?	-	no significant species
MR71-223	5462	124 35.45'	48 22.13'	Eocene	F	-	small assemblage
MR71-257b	5584	124 37.03'	48 17.29'	Ulatisian?	F	-	
PR71-1	5428	124 33.62'	48 21.66'	Refugian or Zemorrian	F	middle bathyal-lower neritic	probably Zemorrian
PR71-2	5544	124 33.55'	48 21.52'	Zemorrian	G	middle to upper bathyal	
PR71-27	5385	124 30.07'	48 17.56'	Narizian	G	-	prob. 1.Narizian
PR71-28	5591	124 30.67'	48 18.30'	Refugian	F	cold water,bathyal	
MR72-66	5685	124 34.62'	48 20.51'	1.Nariz or Refugian	F	cold water,upper bathyal	
MR72-67	5686	124 34.60'	48 19.99'	Narizian	F	cold water, bathyal	
MR72-70	5687	124 34.15'	48 17.99'	Narizian or Refugian	G	-	
MR72-71	5688	124 33.23'	48 18.15'	Refugian	F	cold water,prob.bathyal	
MR72-73	5689	124 37.03'	48 17.29'	e.Narizian	G	cold water,upper bathyal	meager,poor preserv.
MR72-78	5723	124 31.13'	48 16.67'	1.Narizian?	?	-	
MR72-197	6002	124 32.86'	48 16.95'	1.Eocene or Olig.	F/?	-	
MR72-198	6003	124 32.85'	48 16.93'	Narizian?	F	-	small Eocene assem.
MR72-204	6004	124 31.21'	48 16.68'	Narizian,poss. 1.	F	outer neritic-upper bathyal	
PR72-16b	5776	124 31.47'	48 20.18'	Narizian?	F	-	
PR72-17	5777	124 31.75'	48 20.06'	Zemorrian?	?	-	
PR72-30	5778	124 37.48'	48 20.63'	Narizian	F	-	
PR72-31	5779	124 37.47'	48 20.41'	1.Narizian or Refugian	F/?	probably bathyal	
PR72-32	5695	124 36.28'	48 21.18'	1.Narizian	F	-	
M73-97	7049	124 30.15'	48 16.92'	1.Narizian	G	probably bathyal	
M73-98	7008	124 32.07'	48 17.51'	1.Narizian	G	-	
N73-34	8574	124 35.33'	48 22.41'	Narizian	?	-	
P73-28	7198	124 35.57'	48 19.88'	Narizian or e.Refugian	F	outer shelf or upper bathyal	small.poor assem.
S73-34	7263	124 31.17'	48 20.79'	Refugian	F	outer shelf-upper bathyal	
S73-125	7018	124 31.39'	48 16.35'	Ulatisian or e.Nariz.	F	-	
S73-126	7084	124 34.21'	48 16.45'	e.Narizian	F	outer bathyal	
S73-129	7085	124 34.88'	48 16.66'	e.Narizian	G/F	outer sublittoral-lower bathyal	
S73-130	7086	124 35.53'	48 16.64'	e.Narizian	F	-	
S73-150	7089	124 36.87'	48 17.30'	e.Narizian	G	outer shelf-upper bathyal	
S73-150b	7090	124 36.87'	48 17.30'	e.Narizian	G	outer shelf-upper bathyal	
S73-151	7126	124 37.08'	48 17.36'	e.Narizian	G	outer sublittoral-upper bathyal	
S73-155	7091	124 34.54'	48 16.46'	e.Narizian	G	outer shelf-upper bathyal	
S73-157	7127	124 34.87'	48 16.34'	e.Narizian	?	outer sublittoral-bathyal	
S75-42	7630	124 30.61'	48 18.10'	e.Narizian-Ulatisian	?	-	
S75-43	7610	124 30.52'	48 18.20'	1.Eocene?	?	-	very meager assem.
S75-50	7611	124 35.06'	48 22.03'	Narizian?	F	middle to upper bathyal	
				Narizian?	F	cold water,mid-lower bathyal	

Table 2.--(Neah Bay 7-1/2' Quadrangle - Continued)

S75-113	7716	124 33.34'	48 16.31'	Ulatisian	G	bathtyal	
S75-159	7790	124 32.21'	48 20.95'	Zemorrian	?	-	age tentative
S75-162	7692	124 37.37'	48 17.64'	Narizian?	F	probably bathyal	poor assem.
S75-164	7713	124 37.08'	48 17.54'	Narizian?	F/?	outer shelf-bathyal	e.Refug or Nariz
N76-3	7940	124 35.36'	48 22.39'	Refugian-Zemorrian	?	-	
N76-5	7962	124 35.24'	48 22.38'	Zemorrian?	?	-	weak fauna
N76-6	7963	124 35.19'	48 22.33'	Zemorrian?	?	-	
N76-7	8014	124 35.13'	48 22.29'	Refugian-Zemorrian?	?	-	fragments only
N76-8	8015	124 35.02'	48 22.33'	Refugian-Zemorrian	?	-	meager assem.
S76-32	7895	124 36.14'	48 17.19'	Narizian	G	probably outer shelf	
S76-33	7955	124 36.06'	48 17.26'	Ulatisian	F	-	
S76-48	7979	124 35.28'	48 22.21'	Refugian	G	probably upper bathyal	dwarf fauna
S77-127	8328	124 35.47'	48 22.08'	Narizian-Refugian	F	cold water, bathyal	
S77-132	8329	124 35.25'	48 22.22'	Narizian-Refugian	F	deep, cold water	
S78-131	8501	124 30.11'	48 19.42'	Zemorrian	F	shelf conditions	
S78-133	8450 (A)	124 30.20'	48 19.20'	l. Eocene-Oligocene	?	upper bathyal or outer shelf	meager assem.
S78-135	8451 (A)	124 30.11'	48 18.82'	Zemorrian	?	outer shelf or deeper	Zemorrian-l.Nariz
S79-104	8590	124 36.24'	48'16.22'	Eocene??	?	-	fragments only
S79-115	8591	124 32.05'	48 15.07'	Eocene	F	-	e.Nariz or older
S79-148	8651	124 36.06'	48 17.26'	l.Ulatisian-e.Narizian	F	probably bathyal	

Table 2.--(Makah Bay 7-1/2' Quadrangle - Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
PF69-3	4865	124 40.08'	48 19.18'	Narizian,prob.1.	F	-	
WR69-2	4952	124 40.66'	48 16.26'	1.Narizian	F	lower bathyal to abyssal	
WR69-3	4953	124 40.77'	48 16.32'	1.Narizian	F	lower bathyal to abyssal	small,diagnostic assem.
WR69-5	4954	124 40.81'	48 16.52'	1.Narizian	F	lower bathyal to abyssal	
WR69-6	4955	124 40.88'	48 16.62'	1.Narizian	F	lower bathyal to abyssal	small,diagnostic assem.
WR69-7	4956	124 40.87'	48 16.65'	1.Narizian	F	lower bathyal to abyssal	
MCF70-8	5039	124 39.63'	48 21.05'	Ulatisian	G/F	-	small,diagnostic assem. badly distorted specim. possibly older than U.
MCF70-14	5040	124 40.92'	48 17.11'	Eocene	?	-	
MCF70-45	5051	124 38.22'	48 19.16'	Ulatisian	F	-	
MCF70-1	4997	124 37.51'	48 22.21'	1.Narizian-Zemorrian?	?	-	
MCF70-2	4998	124 37.56'	48 22.23'	1.Narizian	F/?	-	age evidence poor
MCF70-3	4999	124 37.53'	48 22.18'	1.Narizian	G	-	
MCF70-4	5000	124 37.60'	48 22.09'	1.Narizian	F	-	small,non-diagnos. assem.
MCF70-8	5002	124 37.80'	48 21.93'	1.Narizian?	?	-	
MCF70-9	5003	124 37.83'	48 21.91'	1.Narizian or e.Refug.	F	-	small,non-diagnos. assem.
MCF70-9	5003	124 37.83'	48 21.91'	1.Narizian-e.Refugian?	?	-	
MCF70-22	5005	124 39.09'	48 22.41'	1.Narizian?	?	-	very small assemblage
MCF70-34	5129	124 41.86'	48 21.06'	Narizian?	F	-	poss.Refugian
MCF70-40	5130	124 41.16'	48 20.39'	Narizian	G	-	
MCF70-41	5131	124 38.52'	48 20.26'	Narizian	G	-	
MCF70-49	5133	124 42.46'	48 21.70'	Narizian	G	-	small,diagnostic assem.
MCF70-50	5133	124 41.93'	48 21.14'	Narizian	G	-	
MR71-168	5322	124 40.76'	48 16.64'	1.Narizian-e.Refugian	F/?	-	
MR71-222	5582	124 40.89'	48 16.85'	1.Narizian	F	outer neritic-bathyal depths	diagnostic assemblage
MR72-36	5682	124 41.63'	48 21.52'	Refugian or Zemorrian?	?	-	meager,non-diagnostic
MR72-171	5729	124 38.05'	48 22.02'	1.Narizian,poss.Refug	F	outer neritic or upper bathyal	
MR72-172	5730	124 37.74'	48 22.17'	Narizian	G	middle or lower bathyal	e.Narizian?
MR72-173	5731	124 37.64'	48 22.07'	Narizian	F	poss.upper to middle bathyal	
M73-175	5732	124 37.94'	48 21.85'	prob.Narizian	F	middle to upper bathyal	possibly Refugian
M73-75	7184	124 40.80'	48 16.02'	Zemorrian or Refugian	F/?	shelf-type environment	small,non-diagnos. assem
M73-79	7037	124 39.85'	48 18.37'	1.Ulatisian-e.Narizian	F	shelf-type environment	prob. e.Nariz
M73-140c	7131	124 39.20'	48 19.38'	Narizian?	?	bathyal depths	meager fauna
P73-14	7137	124 41.15'	48 15.21'	1.Narizian	?	-	
S73-8	7262	124 38.27'	48 20.01'	Ulatisian	G	prob.outer shelf-upper bathyal	
S73-149a	7087	124 39.48'	48 21.15'	e.Narizian	G	inner sublittoral or shallower	<u>Amphistegina</u> present
S73-149b	7088	124 39.48'	48 21.15'	e.Narizian	G	prob.outer shelf or bathyal	
S74-44	7332	124 40.85'	48 16.78'	Narizian?	F/?	outer shelf or bathyal	
S74-46	7333	124 40.85'	48 16.78'	Narizian?	?	outer shelf to upper slope	
S74-48	7334	124 38.70'	48 19.65'	Narizian	?	-	
S74-78	7395	124 37.66'	48 22.37'	Narizian	F	-	possibly Refugian
S74-80	7396	124 37.63'	48 22.32'	Narizian,prob. 1.	G	outer shelf to middle bathyal	diag.Narizian assem.
S74-82	7397	124 39.73'	48 18.53'	Narizian	F	poss. outer shelf	meager assemblage
S74-85	7398	124 40.43'	48 17.75'	Narizian?	?	outer shelf or shallower	small,poor assem.
S74-88	7400	124 37.76'	48 17.02'	Penutian	G	open sea conditions	abund. planktonic forams
S74-89	7401	124 37.80'	48 17.01'	Narizian	F	-	
S75-118	7671	124 41.70'	48 21.98'	Narizian	F	bathyal or deeper	probably e.Narizian

Table 3.--Locations and ages of foraminiferal collections in the Lake Pleasant 15' Quadrangle
(includes the Ellis Mountain, Hoko Falls, Lake Pleasant, and Gunderson Mountain 7-1/2'
Quadrangles).

Ellis Mountain 7-1/2' Quadrangle

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
WLP70-1	5189	124 15.30'	48 13.82'	Zemorian	F	-	
MR71-51	5581	124 19.57'	48 12.58'	Refugian or Zemorian	F	-	
MR71-53	5535	124 21.19'	48 11.46'	1.Ulatisian	F	-	
MR71-58a	5310	124 18.12'	48 11.14'	Eocene?	?	-	
MR71-87b	5279	124 21.68'	48 11.58'	Ulatisian	?	-	B-zone* frags.
MR71-79	5537	124 22.29'	48 11.61'	1.Ulatisian	G	shallow water(neritic)	Amphistegina assem
MR71-110	5281	124 17.20'	48 14.62'	Zemorian	G	-	possibly Saucasian
MR71-513a	5317	124 20.52'	48 13.42'	Refugian or Zemorian	?	-	very meager assem
MR71-114	5338	124 20.39'	48 14.61'	Zemorian	F	-	
MR71-197	5538	124 19.17'	48 11.40'	1.Ulatisian-e.Narizian	F	prob.lower to upper bathyal	
MR71-205	5584	124 18.85'	48 11.64'	Narizian or older	F	-	
MR71-216	5420	124 15.04'	48 11.06'	Narizian?	F/?	probably deep water	small, non-diag.assem
MR71-217	5586	124 15.43'	48 13.35'	Zemorian	G	at least upper bathyal	
MR71-224	5421	124 18.43'	48 11.83'	1.Ulatisian or e.Nariz	F	prob.outer neritic or upper bathyal	
MR71-265	5585	124 21.39'	48 10.52'	1.Ulatisian	F	-	
MR71-273	5378	124 15.78'	48 14.95'	Zemorian	F	probably upper bathyal	very small fauna
MR71-274	5379	124 15.27'	48 14.45'	Zemorian	G	outer neritic to upper bathyal	prob. 1.Zemorian
MR71-296	5587	124 20.91'	48 13.58'	Zemorian?	?	outer shelf to upper bathyal	mixed assemblage
SR71-118a	5426	124 20.95'	48 10.00'	Ulatisian	G	upper neritic to littoral	B-zone* stage
SR71-118b	5588	124 20.95'	48 10.00'	1.Ulatisian	G	warm water,neritic	1. B-zone* position
SR71-118c	5547	124 20.95'	48 10.00'	1.Ulatisian	G	middle to lower neritic	B1-B1a zone*
MR72-185	5796	124 18.78'	48 11.90'	Narizian	F	probably bathyal depths	prob. e.Narizian
MR72-186	5797	124 18.80'	48 11.88'	Narizian	F	-	
MR72-189	5998	124 18.85'	48 11.64'	Narizian?	?	-	very meager assem
MR72-191	5999	124 16.89'	48 11.17'	1.Ulatisian-e.Narizian	F	-	
MR72-192	6000	124 16.89'	48 11.17'	1.Narizian	G	probably upper bathyal	poss. e.Refugian
PR72-10	5734	124 17.35'	48 13.51'	Eocene	?	outer neritic-upper bathyal?	Eocene evidence poor
PR72-11	5774	124 16.52'	48 13.86'	1.Narizian or e.Refug	F/?	middle to upper bathyal	
PR72-13	5775	124 17.50'	48 13.19'	Narizian	F/?	probably bathyal	poss.Refugian
PR72-39	5780	124 20.89'	48 09.30'	Ulatisian or older	?	-	
M73-157	7012	124 17.76'	48 08.40'	e.Nariz or Ulatisian	F/?	prob.inner sublittoral	
P73-31	7199	124 21.65'	48 09.92'	1.Ulatisian or e.Nariz	F/?	probably bathyal	very small assem
S73-100	7182	124 17.35'	48 08.83'	Ulatisian-e.Narizian	?	-	
S73-102	7183	124 17.03'	48 08.79'	Narizian	F/?	probably bathyal	very meager assem
P74-3	7388	124 20.98'	48 13.40'	1.Narizian or e.Refug	F	outer shelf-upper bathyal	
P74-5	7389	124 21.38'	48 12.73'	1.Narizian	G	no less than upper bathyal	
N76-1	7939	124 15.02'	48 12.45'	Narizian?	?	sublittoral depths	possibly Zemorian
S76-101	7997	124 21.64'	48 11.56'	Ulatisian,poss. 1.	G	outer shelf or upper bathyal	B-zone*
S76-208	7999	124 21.18'	48 11.32'	Refugian	F	cold water,outer shelf-upper slope	
N77-7	8218	124 20.91'	48 13.58'	Narizian,prob. e.	G	-	
N77-8	8219	124 20.90'	48 13.60'	Eocene	?	-	small, non-diag.assem
S77-99	8291	124 15.27'	48 14.45'	Zemorian	F	probably bathyal	possibly Saucasian
S78-92	8550	124 17.01'	48 10.31'	Narizian	?	probably bathyal	small,non-diag.assem
S78-139	8435	124 21.16'	48 11.87'	e.Narizian	F	probably bathyal?	
S79-83	8588	124 21.60'	48 09.95'	pre-Ulatisian	?	warm water,bathyal depth	unusually old age

Table 2.--(Makah Bay 7-1/2' Quadrangle - Continued)

S76-47	7935	124 41.13'	48 21.82'	Ulatisian?	F/?	probably bathyal depths	
S76-108	7957	124 39.70'	48 18.55'	1.Ulatisian-e.Narizian	F	bathyal or deeper	
S76-109	7958	124 39.69'	48 18.51'	1.Ulatisian-e.Narizian	F	probably bathyal depths	
S76-110	7959	124 39.85'	48 18.34'	Narizian?	F	-	very small assem.
S76-111	7960	124 39.86'	48 18.31'	Narizian?	F/?	prob. upper bathyal or deeper	very meager assem.
S76-112	7961	124 40.77'	48 16.70'	Narizian	G	upper bathyal or deeper	1.? Narizian
S76-130	7909	124 42.35'	48 21.51'	1.Narizian-Refugian	?	poss. outer shelf or slope	
S76-132	7910	124 42.30'	48 21.23'	Narizian	F	-	small assemblage
P77-7	8320	124 40.82'	48 15.06'	Narizian	G	probably outer shelf	
S77-32	8156	124 39.72'	48 18.48'	Narizian	G/F	outer shelf-upper bathyal	possibly e.Narizian
S77-136	8247	124 40.74'	48 16.67'	1.Narizian	G	prob. upper bathyal	large, diverse assem.
P78-7	8406	124 38.00'	48 17.67'	Penutian?	F	-	
P78-9	8422	124 38.05'	48 17.66'	1.Ulatisian-e.Narizian	F	bathyal depths	
S78-61	8421	124 39.48'	48 21.17'	e.Narizian	G	outer shelf or bathyal	
S78-126	8500	124 41.90'	48 20.99'	Narizian	F	prob. middle to upper bathyal	
S79-46	8617	124 39.75'	48 18.49'	Narizian	F	prob. middle to outer neritic	
S79-47	8617	124 39.75'	48 18.47'	e.Narizian	F	outer shelf-upper bathyal	possibly 1. Ulatisian
S79-50	8587	124 42.65'	48 21.86'	Ulatisian	G	probably bathyal	possibly 1. Ulatisian
S79-51	8619	124 42.51'	48 21.74'	Narizian?	?	-	fragments only

Table 3.--(Hoko Falls 7-1/2' Quadrangle - Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
GCB70-3	5183	124 24.61'	48 13.48'	1.Narizian or Refugian	F	-	
GCB70-4b	5184	124 24.60'	48 12.94'	1.Narizian-e.Refugian	F	-	
GCB70-9	6011	124 24.38'	48 13.60'	e.Refugian	G	outer neritic	characteristic assem.
GCB70-10	5185	124 24.38'	48 13.62'	1.Narizian-e.Refugian	F	-	
MCF70-56	5055	124 25.72'	48 12.06'	Ulatisian	F	-	B-zone* assemblage
MCF70-61	5056	124 26.20'	48 11.00'	1.Narizian	F/?	-	rework.m.Eocene in 1.Nar
MR71-62	5278	124 25.19'	48 11.83'	1.Narizian	G	-	BIA zone*
MR71-64	5416	124 23.22'	48 12.58'	1.Narizian or e.Refug.	G/F	bathtal depths	
MR71-65	5648	124 23.08'	48 12.42'	e.Narizian	F	no higher than upper bathyal	
MR71-66	5536	124 22.74'	48 12.74'	1.Narizian or e.Refug.	F	probably upper bathyal	
MR71-93	5312	124 23.55'	48 13.33'	Eocene?	?	-	
MR71-208	5540	124 23.19'	48 09.98'	Ulatisian?	?	"deep water deposition"	small, poor fauna
MR71-208a	5585	124 23.19'	48 09.98'	Ulatisian	F	no shallower than upper bathyal	largely planktonic
MR71-264	5377	124 22.88'	48 10.53'	Ulatisian	F	-	
PR71-26a	5590	124 24.93'	48 09.88'	1.Ulatisian or e.Nariz.	F	at least upper bathyal	
MR72-28a	5649	124 26.73'	48 13.53'	Narizian?	?	-	
MR72-59	5793	124 26.83'	48 13.61'	1. Eocene	?	-	
MR72-60	5683	124 26.44'	48 13.79'	Refugian or Zemorrian	F	cold water, substantial depths	
MR72-62	5684	124 26.19'	48 14.07'	Refugian	F	lower neritic to bathyal	
MR72-103	5727	124 23.33'	48 13.24'	1.Narizian or Refugian	F/?	middle to lower bathyal	
MR72-104	5795	124 24.99'	48 12.15'	Narizian	F	bathtal depths	
MR72-105	5652	124 24.80'	48 13.25'	Refugian	F	outer neritic to upper bathyal	typical Refugian
MR72-106	5691	124 22.58'	48 12.69'	1.Narizian or Refugian	G	cold water, o.Neritic-u.bathyal	
MR72-108	5728	124 22.93'	48 12.56'	1.Narizian-e.Refugian	F	outer neritic-upper bathyal	
MR72-111	5990	124 24.02'	48 12.56'	1.Narizian	?	-	
MR72-119	5991	124 26.15'	48 14.03'	1.Narizian	G	-	small, poor assemblage
MR72-121	5992	124 26.22'	48 13.76'	1.Narizian	F	-	poss. e.Refugian
MR72-124	5993	124 24.65'	48 13.50'	1.Narizian or e.Refugian	F	deep water, neritic?	
MR72-124a	5664	124 24.65'	48 13.50'	Refugian	F	outer neritic to bathyal	
MR72-125	5865	124 24.51'	48 13.30'	1.Narizian or Refugian	F	-	
MR72-128	5866	124 24.68'	48 12.96'	1.Narizian	G	probably bathyal depths	diagnos. 1.Nariz
MR72-129	5867	124 24.84'	48 12.86'	1.Narizian	G	bathtal depths	
MR72-134	5994	124 27.43'	48 14.02'	1.Narizian	G	outer neritic	
MR72-135	5995	124 27.72'	48 14.93'	1.Narizian	G	outer neritic to upper bathyal	
MR72-156	5872	124 25.38'	48 12.15'	1.Ulatisian or e.Nariz.	F	probably bathyal depths	
MR72-159	5871	124 25.31'	48 12.14'	1.Ulatisian or e.Nariz.	F	bathtal depths	
MR72-160	5870	124 25.30'	48 12.17'	Narizian	G/F	probably bathyal depths	prob. e.Narizian
MR72-161	5869	124 25.25'	48 12.23'	1.Ulatisian or e.Nariz	F	probably bathyal depths	
MR72-168	5868	124 25.02'	48 12.68'	Narizian	F	bathtal to outer neritic	
MR72-193	6001	124 23.17'	48 11.70'	1.Ulatisian	G	warm water, prob. upper neritic	small diagnos.assem
MR72-206	6005	124 27.92'	48 14.98'	1.Ulatisian-e.Narizian	F	outer shelf to bathyal	
PR72-57	5736	124 24.52'	48 13.63'	Narizian or Refugian	F	prob. lower bathyal	
PR72-58	5781	124 24.56'	48 13.52'	1.Narizian	G	bathtal depths	
PR72-61	5737	124 24.10'	48 13.89'	Narizian	G	prob. middle to lower bathyal	
MR72-28a	5649	124 26.73'	48 13.55'	Narizian?	?	-	Nariz evidence poor
PR72-63	6090	124 23.65'	48 14.14'	Refugian	G	prob. outer neritic	prob. e.Refugian
PR72-64	5782	124 23.65'	48 14.32'	Narizian	F	middle to lower bathyal	prob. 1.Narizian
M73-103	7009	124 27.77'	48 14.97'	Ulatisian or e.Nariz	F	-	

Table 3.--(Hoko Falls 7-1/2' Quadrangle - Continued)

M73-104	7041	124 27.86'	48 14.99'	e.Narizian	F	-	
M73-114	7245	124 24.80'	48 12.77'	Refugian	F	outer sublittoral	
P73-43	7251a	124 25.70'	48 12.28'	Narizian	F	-	
P73-44	7252	124 25.78'	48 12.35'	Narizian	G	outer sublittoral to bathyal	prob. e.Narizian
P73-45	7242	124 25.84'	48 12.44'	e.Narizian	F	outer sublittoral to upper bathyal	
P73-46	7253	124 25.96'	48 12.48'	e.Narizian	G	outer shelf or upper slope	
P73-47	7138	124 26.36'	48 12.66'	Narizian?	F	probably outer shelf	1.Ulatisian or e.Nariz.
P73-35	7179	124 24.73'	48 12.80'	e.Refugian	F	prob. outer sublittoral	latest Nariz?
P74-1	7386	124 23.13'	48 14.49'	Narizian-Zemorrian	?	-	very meager assem.
P74-2	7387	124 22.87'	48 14.49'	Narizian-Zemorrian	F/?	outer shelf to upper bathyal	
P74-13	7390	124 24.59'	48 13.66'	Narizian or e.Refug	F	no less than bathyal	small assemblage
P74-14	7391	124 25.05'	48 13.77'	Narizian?	?	outer shelf to upper bathyal	
S74-87	7399	124 25.04'	48 13.50'	1.Narizian or Refug	F	outer shelf to upper bathyal	
S74-99	7403	124 23.41'	48 10.05'	Narizian, prob. e.	G	-	small, diag. assem
P75-25	7716a	124 25.18'	48 09.98'	Ulatisian	G	shallow, warm water	<u>Amphistegina</u>
P75-48	7612	124 23.76'	48 13.98'	Narizian?	F	cold water, bathyal	most forms small
P75-49	7670	124 23.72'	48 13.92'	Narizian	F	bathyal to outer shelf	
P75-52	7763	124 23.63'	48 13.98'	Refugian	?	-	
S75-20	7651	124 27.61'	48 12.41'	Eocene?	?	-	
S75-57a	7669	124 23.41'	48 10.05'	Narizian	G/F	upper or middle bathyal	tentative age
S75-88	7760	124 27.74'	48 14.90'	Ulatisian	?	-	small, non-diag. assem
S75-89	7712	124 27.67'	48 14.93'	e.Narizian	G	cold water, prob. bathyal	prob. e.Narizian
S75-90	7734	124 27.58'	48 14.78'	e.Narizian	G	outer shelf to upper bathyal	very small assem
S75-94	7735	124 27.72'	48 14.85'	Ulatisian or e.Nariz	?	outer shelf or bathyal	diagnos. Nariz assem
S75-95	7761	124 26.61'	48 14.71'	Refugian	G	probably middle bathyal	prob. e.Refugian
S76-205	7998	124 29.92'	48 13.84'	Ulatisian or e.Nariz	F/?	probably bathyal	
N77-1	8216	124 23.77'	48 13.72'	Ulatisian-e.Narizian	F/?	upper bathyal to outer shelf	
N77-2	8241	124 23.81'	48 14.02'	Eocene	?	probably bathyal	meager age evidence
N77-3	8240	124 23.73'	48 13.87'	Ulatisian?	?	"substantial water depth"	
N77-4	8217	124 23.30'	48 14.33'	Eocene	F/?	-	
N77-13	8242	124 22.60'	48 14.45'	Ulatisian or older	?	-	
S78-53	8420	124 29.31'	48 13.80'	Ulatisian or Penutian	F	open sea conditions	small, poor assem
S78-68	8497	124 26.28'	48 11.01'	Ulatisian or e.Nariz	?	probably bathyal	<u>Amphistegina</u> present
S78-78	8458	124 23.17'	48 11.75'	1.Ulatisian	G	middle to inner shelf	
S78-95	8498	124 23.15'	48 12.40'	Narizian	F	no less than bathyal	
S78-121	8499	124 23.44'	48 10.45'	Ulatisian or e.Nariz	F/?	-	very small assem
S78-156	8437	124 26.77'	48 12.07'	Ulatisian?	F/?	-	small, poor assem
S79-77	8619	124 25.92'	48 12.23'	Narizian?	?	-	Narizian? frags
S79-132	8628	124 28.03'	48 14.51'	Zemorrian	G	warm, shallow water	<u>Amphistegina californica</u>
S79-135	8852	124 27.91'	48 12.40'	Zemorrian or younger	?	probably shelf	poss. Saucessian
PHB-8	7255	124 23.90'	48 14.09	1.Narizian or e.Refug	F	outer shelf or upper slope	very small assem.
PHB-9	7196	124 24.03'	48 14.01'	e.Refugian	F	outer shelf to upper bathyal	poss. 1.Narizian
PHB-12	7256	124 24.35'	48 13.83'	1.Narizian	F	outer shelf conditions	diagnos. Refug assem
PHB-14	7257	124 24.48'	48 13.76'	Refugian	G	outer shelf or upper slope	poss. 1.Narizian
PHC-17b	7259	124 23.30'	48 14.33'	Refugian	F	outer shelf or upper slope	poss. 1.Narizian
PHC-18	7260	124 24.35'	48 13.63'	Refugian	F	outer shelf or upper slope	
PHD-3	7093	124 24.47'	48 13.55'	e.Refugian	G	prob. inner sublittoral	
PHD-6	7094	124 24.41'	48 13.21'	Refugian?	?	-	age evidence poor
PHD-7	7095	124 24.50'	48 13.10'	e.Refugian?	F	outer shelf to upper bathyal	poss. 1.Narizian
PHD-8	7261	124 24.63'	48 12.99'	1.Narizian	F	probably outer shelf	
PHE-5	7197	124 24.65'	48 13.20'	1.Narizian or e.Refug	F	outer sublittoral to upper bathyal	

Table 3.--(Lake Pleasant 7-1/2' Quadrangle - Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
MR71-162	5376	124 16.24'	48 07.48'	middle Eocene	?	middle bathyal-abyssal	
SR72-34	5641	124 15.87'	48 00.78'	1. Narizian	G	outer neritic-upper bathyal	
S73-64	7180	124 15.17'	48 06.68'	middle-1. Eocene	?	prob. medium to deep water	very meager assem.
S73-65	7181	124 16.14'	48 07.49'	Zemorrian?	?	poss. deep water environ.	very meager assem.
S77-71	8198	124 15.87'	48 00.78'	Narizian	F	no less than upper bathyal	
S77-72	8199	124 15.87'	48 00.78'	Narizian?	?	probably bathyal	age tentative
S78-75	8440	124 18.57'	48 07.18'	Ulatisian or older	?	outer shelf to upper slope	
S79-94	8589	124 18.52'	48 07.24'	e. Narizian or older	?		
S85-60	9052	124 15.86'	48 00.78'	e.-mid. Narizian	F	middle bathyal or deeper	very meager assem.

Gunderson Mountain 7-1/2' Quadrangle

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
P75-25	7716(A)	124 25.17'	48 09.98'	Ulatisian	G	warm, shallow water	

*Eocene Stages of Mallory (1959) .

Table 4.--Locations and ages of foraminiferal collections in the Ozette Lake 15' Quadrangle
(includes the Umbrella Creek, Ozette, Dickey Lake, and Allens Bay 7-1/2' Quadrangles).

Umbrella Creek 7-1/2' Quadrangle

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
MCF70-49	5052	124 36.38'	48 12.21'	Narizian	G	lower bathyal to abyssal	
MR71-245c	5583	124 30.20'	48 11.89'	Ulatisian-e.Narizian	F	no less than bathyal	
MR71-291	5272	124 31.63'	48 13.53'	Refugian	F	-	
S73-121	7264	124 32.08'	48 13.32'	Ulatisian	?	-	Ulat. or lower
S75-146	7789	124 37.16'	48 14.18'	Ulatisian?	F/?	-	1.Ulatisian-e.Nariz
S75-166	7714	124 37.01'	48 14.40'	Ulatisian	F	cold, deep water	
S76-51	7936	124 32.09'	48 13.31'	Ulatisian	G	-	
S76-61	7937	124 31.69'	48 12.42'	Ulatisian	F	-	
S76-76	7896	124 35.97'	48 13.19'	Narizian	G	upper bathyal or shallower	prob. e.Narizian
S77-87b	8214	124 35.79'	48 13.01'	Refugian	G	upper slope or outer shelf	
S77-90	8215	124 36.93'	48 13.80'	Narizian	F	probably bathyal	prob. e.Narizian
S78-148	8436	124 35.85'	48 11.63'	Ulatisian?	F	outer shelf to bathyal	
N80-37	8882	124 31.46'	48 13.90'	Ulatisian	F/?	no less than bathyal	

Dickey Lake 7.5' Quadrangle

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
MR71-275	5380	124 35.44'	48 00.70'	Narizian	?	lower bathyal to abyssal	age evidence poor
MR71-280a	5381	124 34.40'	48 02.92'	Narizian	?	poss. "fairly deep water"	small, poor assem
SR71-105	5589	124 36.41'	48 07.07'	Ulatisian?	?	-	poss. e.Narizian
P75-38	7653	124 31.96'	48 04.37'	Eocene?	?	-	age evidence weak
S77-65	8197	124 35.27'	48 01.17'	Eocene?	?	-	age evidence weak
S80-102	8817	124 36.51'	48 07.07'	Ulatisian-e.Narizian	?	cold water, prob. bathyal	age evidence weak

Table 4.--(Ozette 7-1/2' Quadrangle -Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
PA-5f	5429	124 41.91'	48 14.79'	Narizian	F	middle to upper bathyal	prob. l. Narizian
WNA67-7c	4555	124 41.88'	48 14.85'	Narizian-e. Refugian	F	-	
WNA67-25	4556	124 42.81'	48 10.83'	Narizian	F/?	-	
WNA67-44	4559	124 43.16'	48 09.06'	1. Refugian-e. Zemorrian	F	-	
MR69-80	4868	124 41.95'	48 14.82'	1. Narizian	F	-	
MR69-80	4891	124 41.95'	48 14.82'	Narizian or Ulatisian	?	-	
MR69-95	4919	124 44.65'	48 09.34'	Zemorrian or Saucisian?	?	-	
WR69-10	4957	124 41.91'	48 14.89'	1. Narizian	G	lower bathyal to abyssal	good age control
WR69-11	4958	124 41.91'	48 14.89'	1. Narizian	G	-	
WR69-12	4959	124 41.91'	48 14.89'	1. Narizian	G	-	
WR69-13	4960	124 41.91'	48 14.89'	1. Narizian	G	-	
WR69-14	4961	124 41.91'	48 14.89'	1. Narizian	G	-	
MCF70-55	5053-4	124 38.60'	48 12.73'	Narizian	F	-	
MR71-221b	5587	124 41.96'	48 14.84'	Narizian	G	bathyal or deeper	prob. e. Narizian
M73-48	7243	124 44.69'	48 09.38'	1. Eocene?	?	-	
M73-49	7244	124 44.69'	48 09.38'	Zemorrian?	?	outer sublittoral-upper bathyal?	
S73-131	7186	124 37.83'	48 13.80'	e. Narizian	F	"substantially deep"	
S73-132	7187	124 37.88'	48 13.55'	e. Narizian	F	outer shelf to upper bathyal	poss. l. Ulatisian
S73-134	7051	124 38.12'	48 13.37'	1. Ulatisian	G	outer shelf-bathyal?	
S73-141	7019	124 38.48'	48 12.61'	e. Narizian	F	-	
S74-91	7402	124 38.89'	48 12.68'	Eocene?	?	-	
S75-138	7632	124 41.92'	48 14.80'	Narizian	F	cold, deep water	
S75-185	7737	124 38.48'	48 12.61'	Ulatisian	F	middle to upper bathyal	
S75-198	7632	124 41.92'	48 14.80'	Narizian	F	outer shelf to upper bathyal	
S75-224	7738	124 39.52'	48 13.28'	e. Narizian	?	no less than bathyal	
S76-14	7892	124 39.65'	48 13.76'	1. Narizian	F	-	
S76-18	7908	124 38.13'	48 13.70'	e. Narizian	G	-	
S76-19	7978	124 38.32'	48 13.70'	1. Ulatisian-e. Narizian	F	probably bathyal	
S76-24	7893	124 39.82'	48 13.66'	1. Ulatisian	G	-	
S76-25	7894	124 39.54'	48 13.27'	e. Narizian	G/F	prob. middle to upper bathyal	poss. l. Ulatisian
S76-68	7938	124 39.40'	48 14.06'	e. Narizian	G	probably upper bathyal	
S082-4	8997	124 44.67'	48 09.37'	1. Zemorrian	F	-	poss. Saucisian

Table 4.--(Allens Bay 7-1/2' Quadrangle - Continued)

Field Number	Lab Number	Longitude (W)	Latitude (N)	Age	Call	Paleoenvironment	Remarks
M73-30	7000	124 40.84'	48 01.41'	Refugian	G	poss. sublittoral-upper bathyal	good fauna