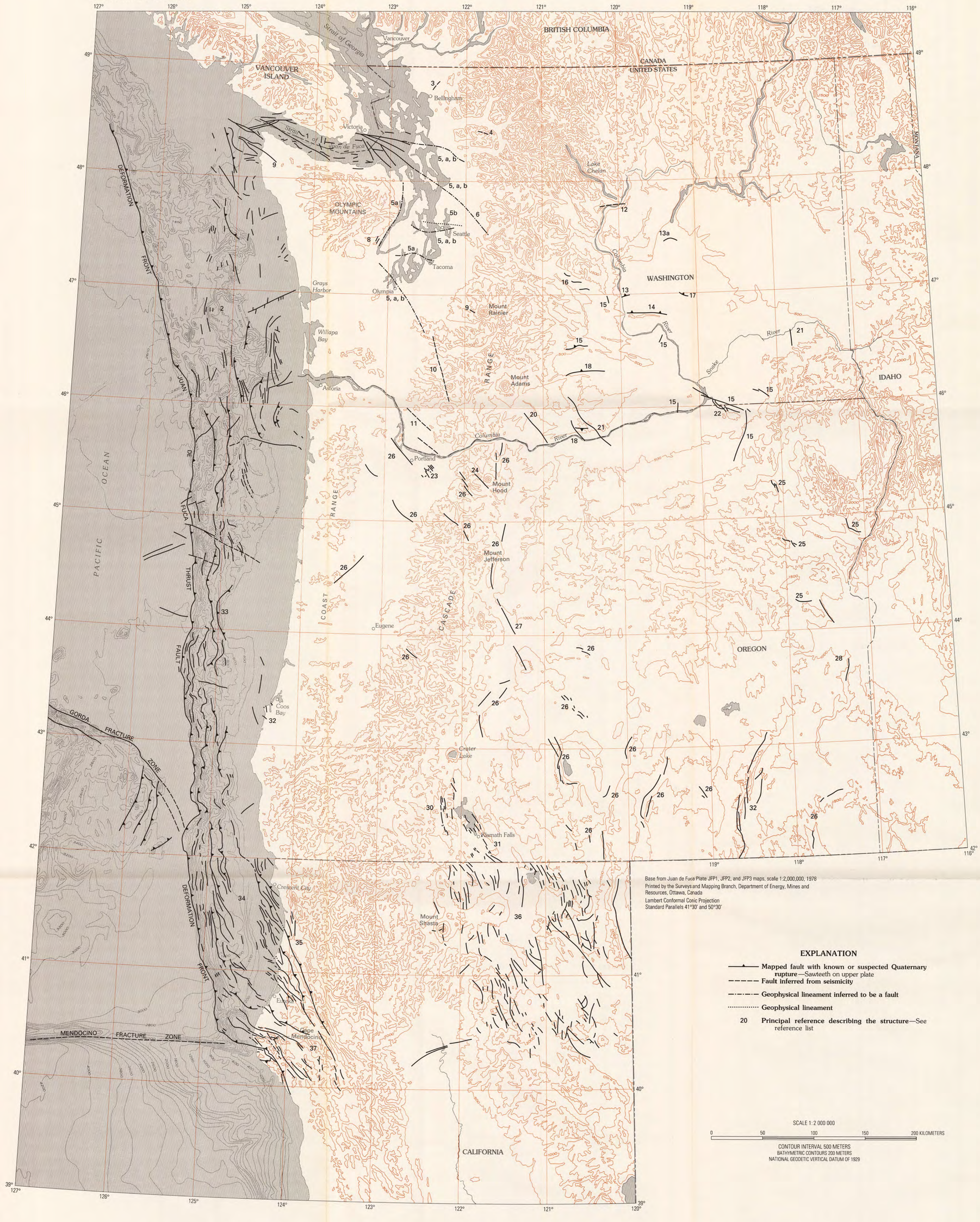
(200)
QB
no. 1560
c.2
Copy in R

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PROFESSIONAL PAPER 1560
PLATE 1



The numbers accompanying structures are indexed to the references. Offshore faults shown on this map do not necessarily cut reflectors interpreted to be Quaternary in age because ruptures on blind thrusts do not reach the surface (S.H. Clarke, U.S. Geological Survey, oral commun., 1991). Inclusion of a structure on this map does not necessarily imply that it is seismogenic. Many of these faults, particularly offshore, probably represent secondary rupture, possibly during subduction-zone events. The variation in frequency of faulting in the different States is partly geologic but also reflects disparities in the extent of field studies due to funding differences among the States. In Oregon, faults documented in Pezzopane and Weldon (1993) and Pezzopane (1993) are shown only if Quaternary deformation is documented; otherwise, many more faults and lineaments could be shown.

MAP REFERENCES

1. Wagner, H.C., and Tomson, J.H., 1987, Offshore geology of the Strait of Juan de Fuca, State of Washington and British Columbia, Canada: Washington State Department of Natural Resources Open-File Report 87–1, 15 p., 7 pls., scale 1:250,000.
2. Wagner, H.C., Batatian, L.D., Lambert, T.M., and Tomson, J.H., 1986, Preliminary geologic framework studies showing bathymetry, locations of geophysical tracklines and exploratory wells, sea-floor geology and deeper geologic structures, magnetic contours, and inferred thickness of Tertiary rocks on the continental shelf and upper continental slope off southwestern Washington between latitudes 46°N and 48°30'N and from the Washington coast to 125°20'W: Washington State Department of Natural Resources Open-File Report 86–1, 8 p., 6 pls., scale 1:250,000.
3. Qamar, A.I., and Zollweg, J.E., 1990, The 1990 Deming, Washington earthquakes—A sequence of shallow thrust earthquakes in the Pacific Northwest [abs.]: EOS [American Geophysical Union Transactions], v. 71, no. 41, p. 1145.
4. Zollweg, J.E., and Johnson, P.A., 1989, The Darrington seismic zone in northwestern Washington: Seismological Society of America Bulletin, v. 79, no. 6, p. 1833–1845.

5, a, b. Gower, H.D., Yount, J.C., and Crosson, R.S., 1985, Seismotectonic map of the Puget Sound region, Washington: U.S. Geological Survey Miscellaneous Investigations Series Map I–1613, 15 p., scale 1:250,000.

5a. Harding, S.T., Urban, T.C., and Barnhard, T.P., 1988, Preliminary evidence of possible Quaternary faulting in Puget Sound, Washington, from a multichannel marine seismic-reflection survey, *in* Hays, W.W., ed., Proceedings of Conference XLII, Workshop on evaluation of earthquake hazards and risk in the Puget Sound and Portland areas: U.S. Geological Survey Open-File Report 88–541, p. 178–193.

5b. Bucknam, R.C., Hemphill-Haley, Eileen, and Leopold, E.B., 1992, Abrupt uplift within the past 1700 years at southern Puget Sound, Washington: Science, v. 258, no. 5088, p. 1611–1614.
Johnson, S.Y., Potter, C.J., and Armentrout, J.M., 1994, Origin and evolution of the Seattle fault and Seattle basin, Washington: Geology, v. 22, p. 71–74.

6. Walsh, T.J., 1984, Geology and coal resources of central King County, Washington: Washington Division of Geology and Earth Resources Open-File Report 93–4, 23 p.
Walsh, T.J., and Logan, R.L., 1985, Geological and geophysical expression of the Olympic-Wallowa lineament (OWL) near North Bend, Washington [abs.]: Geological Society of America Abstracts with Programs, v. 17, no. 6, p. 416.
7. Howard, K.A., Aaron, J.M., Brabb, E.E., Brock, M.R., Gower, H.D., Hunt, S.J., Milton, D.J., Muehlberger, W.R., Nakata, J.K., Plafker, George, Prowell, D.C., Wallace, R.E., and Witkind, I.J., 1978, Preliminary map of young faults in the United States as a guide to possible fault activity: U.S. Geological Survey Miscellaneous Field Studies Map MF–916, 2 sheets, scale 1:5,000,000.
8. Wilson, J.R., Bartholomew, M.J., and Carson, R.J., 1979, Late Quaternary faults and their relationship to tectonism in the Olympic Peninsula, Washington: Geology, v. 7, no. 5, p. 235–239.
9. Crosson, R.S., and Frank, D.G., 1975, The Mt. Rainier earthquake of July 18, 1973, and its tectonic significance: Seismological Society of America Bulletin, v. 65, no. 2, p. 393–401.
10. Weaver, C.S., and Smith, S.W., 1983, Regional tectonic and earthquake hazards implications of a crustal fault zone in southwestern Washington: Journal of Geophysical Research, v. 88, no. B12, p. 10371–10383.
11. Grant, W.C., and Weaver, C.S., 1986, Earthquakes near Swift Reservoir, Washington, 1958–1963—Seismicity along the southern St. Helens seismic zone: Seismological Society of America Bulletin, v. 76, no. 6, p. 1573–1587.
Yelin, T.S., and Patton, H.J., 1991, Seismotectonics of the Portland, Oregon, region: Seismological Society of America Bulletin, v. 81, no. 1, p. 109–130.
12. Malone, S.D., and others, 1978, Earthquake monitoring of the Hanford region, eastern Washington: University of Washington Geophysics Program, Annual technical report (including quarterly technical report 78–B), 85 p.
13. Geomatrix Consultants, Inc., 1990, Seismotectonic evaluation, Walla Walla section of the Columbia Plateau geomorphic province, v. 1, 6 pls. [final report under contract to the U.S. Bureau of Reclamation]: Available from the U.S. Bureau of Reclamation, Division of Geology, Building 67, Denver Federal Center, Denver, CO 80225–0007.

13a. Reidel, S.P., Campbell, N.P., Fecht, K.R., and Lindsey, K.A., 1994, Late Cenozoic structure and stratigraphy of south-central Washington: Washington Division of Geology and Earth Resources Bulletin 80, p. 159–180.

14. West, M.W., and Shaffer, M.E., 1989, Late Quaternary tectonic deformation in the Smyrna Bench and Saddle Gap segments, Saddle Mountains anticline, Yakima fold belt, central Columbia basin, Washington [abs.]: Geological Society of America Abstracts with Programs, v. 21, no. 5, p. 157–158.
15. Tolan, T.L., and Reidel, S.P., 1989, Structure map of a portion of the Columbia River flood-basalt province, *in* Reidel, S.P., and Hooper, P.R., eds., Volcanism and tectonism in the Columbia River flood-basalt province: Geological Society of America Special Paper 239, scale 1:500,000.
U.S. Department of Energy, 1988, Site characterization plan; Reference repository location, Hanford site, Washington [consultation draft]: Washington, D.C., U.S. Office of Civilian Radioactive Waste Management Report DOE/RW–0164, v. 1, p. 1.3.14–1.3.40.
16. Watt, R.B., Jr., 1979, Late Cenozoic deposits, landforms, stratigraphy, and tectonism in Kittitas County, Washington: U.S. Geological Survey Professional Paper 1127, 18 p.
17. Shaffer, M.E., and West, M.W., 1989, Quaternary faulting in the Frenchman Hills anticline, Yakima fold belt, central Columbia basin, Washington [abs.]: Geological Society of America Abstracts with Programs, v. 21, no. 5, p. 142.
18. Campbell, N.P., and Bentley, R.D., 1981, Late Quaternary deformation of the Toppenish Ridge uplift in south-central Washington: Geology, v. 9, no. 11, p. 519–524.
19. Foundation Sciences, Inc., 1980, Geologic reconnaissance of parts of the Walla Walla and Pullman, Washington, and Pendleton, Oregon, 1° × 2° AMS quadrangles: Seattle, Wash., U.S. Army Corps of Engineers, 83 p., 3 pl.
20. Anderson, J.L., 1987, The structural geology and ages of deformation of a portion of the southwest Columbia Plateau, Washington and Oregon: Los Angeles, University of Southern California, Ph.D. dissertation, 283 p.
21. U.S. Army Corps of Engineers, 1983, The Dalles Lake, Columbia River, Oregon-Washington; the Dalles and John Day Lakes, earthquake and fault study: Seattle, Wash., U.S. Army Corps of Engineers, Design Memorandum No. 26. 65 p.
22. Mann, G.M., and Meyer, C.E., 1993, Late Cenozoic structure and correlations to seismicity along the Olympic-Wallowa Lineament, northwest United States: Geological Society of America Bulletin, v. 105, p. 853–871.
23. Madin, I.P., and Pezzopane, S.K., 1990, Quaternary deformation in the Portland metro area, *in* Walsh, T.J., Madin, Ian, Noson, L.L., and Yelin, T.S., eds., Proceedings of Conference LX, 4th annual workshop on earthquake hazards in the Puget Sound and Portland area: U.S. Geological Survey Open-File Report 90–703, p. 4.
24. Geomatrix Consultants, Inc., 1990, Seismotectonic evaluation, Wasco Dam site, 115 p., 2 maps, scales 1:500,000 and 1:250,000 [final report to the U.S. Bureau of Reclamation under project 1421A]: Available from the U.S. Bureau of Reclamation, Division of Geology, Building 67, Denver Federal Center, Denver, CO 80225–0007.
25. Geomatrix Consultants, Inc., 1989, Seismotectonic evaluation, Mann Creek Dam site and Mason Dam site, 118 p., 2 maps, scales 1:500,000 and 1:250,000 [final report to the U.S. Bureau of Reclamation under project 1419A]: Available from the U.S. Bureau of Reclamation, Division of Geology, Building 67, Denver Federal Center, Denver, CO 80225–0007.
26. Pezzopane, S.K., 1993, Active faults and earthquake ground motions in Oregon: University of Oregon, Ph.D. dissertation, 208 p., 1 pl.
Pezzopane, S.K., and Weldon, R.J., 1990, Holocene fault activity between the Basin and Range and high Cascades, Oregon [abs.]: EOS [American Geophysical Union Transactions], v. 71, no. 43, p. 1608.
Pezzopane, S.K., and Weldon, R.J., 1993, Tectonic role of active faulting in central Oregon: Tectonics, v. 12, no. 5, p. 1140–1169.
27. Hawkins, F.F., LaForge, R.C., and Gilbert, J.D., 1989, Seismotectonic study for Wickiup and Crane Prairie Dams, Deschutes project, Oregon, U.S. Bureau of Reclamation Seismotectonic Report 89–2, 38 p.: Available from the U.S. Bureau of Reclamation, Geotechnical Engineering and Geology Division, Building 67, Denver Federal Center, Denver, CO 80225–0007.
28. Hawkins, F.F., Gilbert, J.D., and LaForge, R.C., 1989, Seismotectonic study for Warm Springs Dam-Vale project and Owhyee Dam-Owhyee project, Oregon, U.S. Bureau of Reclamation Seismotectonic Report 89–6, 35 p., 1 map, scale 1:1,500,000: Available from the U.S. Bureau of Reclamation, Geotechnical Engineering and Geology Division, Building 67, Denver Federal Center, Denver, CO 80225–0007.
29. McInelly, G.W., and Kelsey, H.M., 1990, Late Quaternary tectonic deformation in the Cape Arago-Bandon region of coastal Oregon as deduced from wave-cut platforms: Journal of Geophysical Research, v. 95, no. B5, p. 6699–6713.
30. Hawkins, F.F., Foley, L.L., and LaForge, R.C., 1989, Seismotectonic study for Fish Lake and Fourmile Lake Dams, Rogue River project, Oregon, U.S. Bureau of Reclamation Seismotectonic Report 89–3, 26 p.: Available from the U.S. Bureau of Reclamation, Geotechnical Engineering and Geology Division, Building 67, Denver Federal Center, Denver, CO 80225–0007.
31. Sherrod, D.R., and Pickthorn, L.B.G., 1992, Geologic map of the west half of the Klamath Falls 1° × 2° quadrangle, south-central Oregon: U.S. Geological Survey Miscellaneous Investigations Series Map I–1282, scale 1:250,000.
Sherrod, D.R., and Smith, J.G., 1989, Preliminary map of upper Eocene to Holocene volcanic and related rocks of the Cascade Range, Oregon: U.S. Geological Survey Open-File Report 89–14, 20 p., scale 1:500,000.
Sherrod, D.R., 1989, Written communications to I.P. Madin; unpublished mapping.
32. Hemphill-Haley, M.A., Page, W.D., Carver, G.A., and Burke, R.M., 1989, Holocene activity of the Alvord fault, Steens Mountain, southeastern Oregon, 38 p. [final unpublished report to the U.S. Geological Survey under Grant No. 14–08–0001–g1333]: Available from the U.S. Geological Survey Library, 12201 Sunrise Valley Drive, Reston, VA 22092–0001.
33. Goldfinger, Chris, Kulm, L.D., Yeats, R.S., Mitchell, C.E., Weldon, R.J., II, Peterson, C.P., Darienzo, M.E., Grant, W.C., Priest, G.R., 1992, Neotectonic map of the Oregon continental margin and adjacent abyssal plain: Oregon Department of Geology and Mineral Industries Open-File Report 0–92–4, 15 p., 2 pls.
Goldfinger, Chris, Kulm, L.D., and Yeats, R.S., 1992, Written communication to T.J. Walsh.
34. Clarke, S.H., Jr., 1990, Map showing geologic structures of the northern California continental margin: U.S. Geological Survey Miscellaneous Field Studies Map MF–2130, scale 1:250,000.
Clarke, S.H., Jr., 1992, Geology of the Eel River basin and adjacent region—Implications for late Cenozoic tectonics of the southern Cascadia subduction zone and Mendocino triple junction: American Association of Petroleum Geologists Bulletin, v. 76, no. 2, p. 199–224.
35. Clarke, S.H., Jr., and Carver, G.A.,1992, Late Holocene tectonics and paleoseismicity, southern Cascadia subduction zone: Science, v. 255, no. 5041, p. 188–192.
36. Jennings, C.W., 1985, An explanatory text to accompany the 1:750,000 scale fault and geologic maps of California: California Division of Mines and Geology Bulletin 201, 197 p., 2 sheets, scale 1:750,000.
37. Jennings, C.W., 1992, Preliminary fault activity map of California: California Division of Mines and Geology Open-File Report 92–03, 76 p.

MAP SHOWING KNOWN OR SUSPECTED FAULTS WITH QUATERNARY DISPLACEMENT IN THE PACIFIC NORTHWEST

By

Albert M. Rogers, Timothy J. Walsh, William J. Kockelman, and George R. Priest

1996