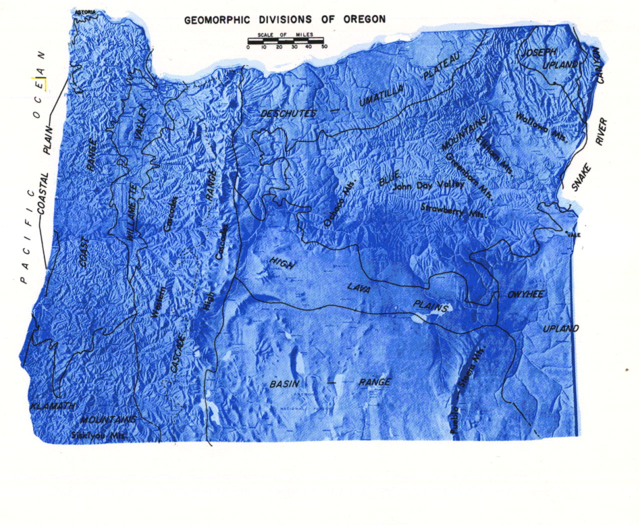
GMS-11

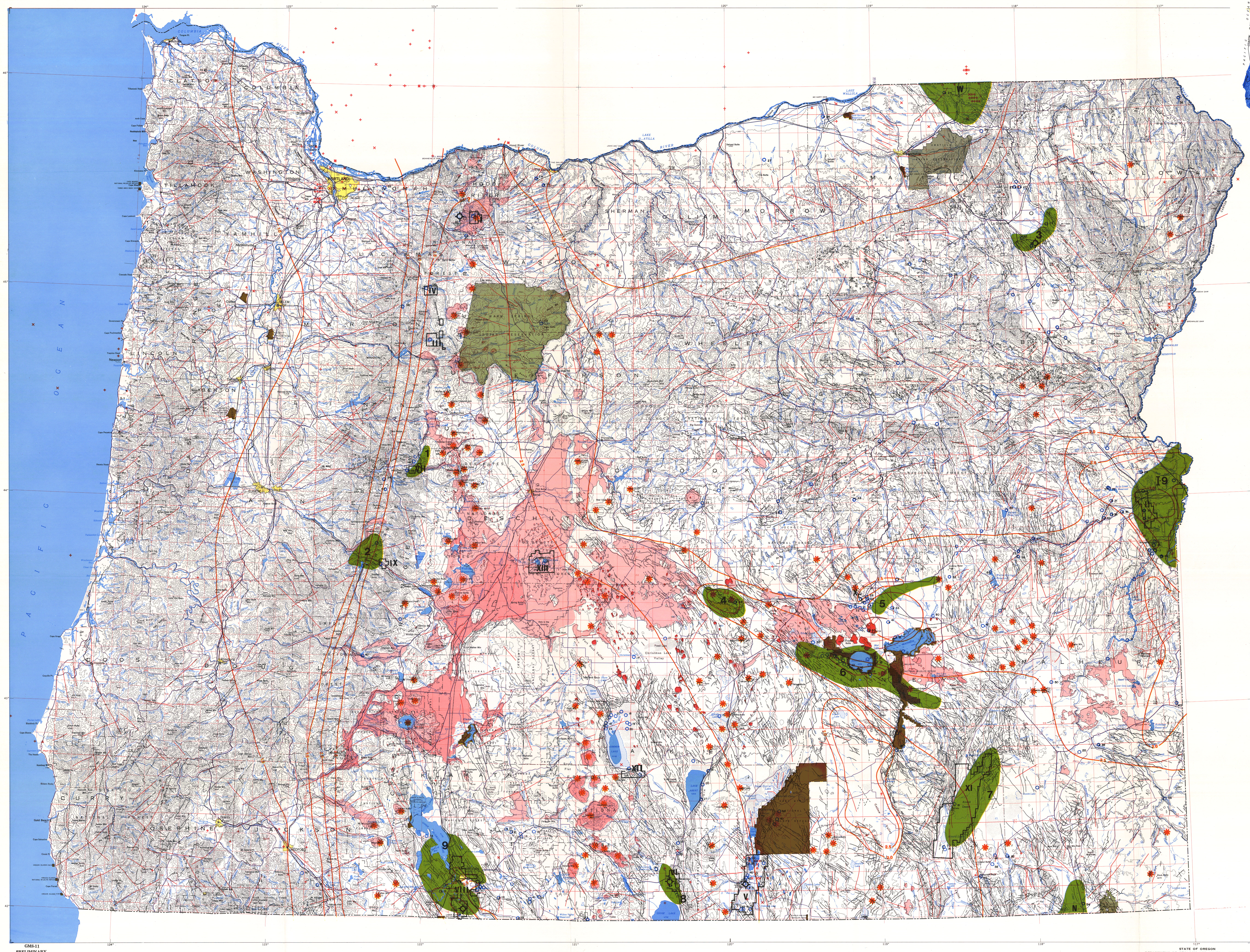


GMS-11

PRELIMINARY GEOTHERMAL RESOURCE MAP OF OREGON 1978

Compiled by Joseph F. Riccio

SCALE 1:500,000



Compiled by Joseph F. Riccio

LEGEND

GEOLOGIC UNITS

Intrusive volcanic rock, Pleistocene to Holocene age
These rocks, which represent feeders for Holocene and upper Pleistocene flows and pyroclastic ejecta, are comprised primarily of andesite and diabase plugs, dikes, and vent breccia as well as rhyolitic and dacitic domal masses and small basaltic bodies. They do not include the mafic and silicic intrusive rocks of Pliocene-Pleistocene age of Peck and Wells (1961) or Walker (1977)

Extrusive volcanic rock, Pleistocene to Holocene age
These rocks include andesite, basalt, rhyolite, dacite, and obsidian flows and domes, flow breccia, and rhyolite pumice cones. They do not include the basalt and andesite flows and flow breccia of Pliocene-Pleistocene age of Peck and Wells (1961) or Walker (1977)

Pyroclastic volcanic rock, Pleistocene to Holocene age
Semiconsolidated to unconsolidated subaerial deposits of basaltic and andesitic ejecta, pumice, and ash. The pyroclastic rocks of Pliocene-Pleistocene age of the above authors are not included

Major volcanic centers and cones of late Tertiary to Quaternary age
Includes the large mafic and silicic units of Walker (1977) and those shown on the AAPG Geological Highway Map No. 6 (Bennison and others, 1962)

GEOTHERMAL DATA

Low-temperature geothermal resource areas
The numbered regions on the map represent areas greater than 20 km^2 in which geothermal fluids are believed to occur in aquifers within 1 km of the land surface. These areas were defined on the basis of temperature measurements of thermal springs and wells (10°C above mean annual air temperatures), thermal gradients in excess of 30°C/km, and conductive heat flow measurements (heat flow is generally more than 1.5 HFU for the areas shown.) Limits of the area are approximate and subject to change pending further geothermal studies and evaluation. These areas may also contain hot-water hydrothermal convection systems that could range from 90° to >150°C. Also, as additional geothermal studies are completed, other low-temperature resource areas may be identified

1. BELKNAP-FOLEY HOT SPRINGS
2. WILLAMETTE PASS
3. CRAIG MOUNTAIN – COVE (LA GRANDE)
4. GLASS BUTTES
5. NORTHERN HARNEY BASIN
6. SOUTHERN HARNEY BASIN
7. ALVORD DESERT
8. LAKEVIEW
9. KLAMATH FALLS

I-9. WESTERN SNAKE RIVER PLAIN, IDAHO
N. McDERMITT, NEVADA
W. WALLA WALLA, WASHINGTON

Known Geothermal Resource Areas (KGRA)
Areas classified by the U.S. Geological Survey as Known Geothermal Resource Areas. Boundaries shown are those in existence in 1978 and are subject to change

I MT. HOOD
II VALE HOT SPRINGS
III BREITENBUSH HOT SPRINGS
IV CAREY HOT SPRINGS
V CRUMP GEYSER
VI LAKEVIEW
VII BELKNAP-FOLEY HOT SPRINGS
VIII KLAMATH FALLS
IX McCREDIE HOT SPRINGS
X BURNS BUTTE
XI ALVORD
XII SUMMER LAKE
XIII NEWBERRY CALDERA

Heat flow contours
A heat flow unit (HFU) = 10^{-6} cal cm^2/sec or 4.19×10^{-2} W/m^2

○ 42 Thermal spring °C

○ 22 Thermal Well °C

Geothermal exploratory well

82 / 1220 — BHT °C (Bottom hole temperature); TDm (Total depth in meters)

GEOLOGIC SYMBOLS

Faults, *based on published data; dashed where approximately located*

Lineaments
Based on unpublished data from preliminary interpretation of Earth Resource Technology Satellite (ERTS) imagery of Oregon

Contact, approximate

Earthquake epicenters

Symbol		Magnitude
+	Magnitude ≤	3.7
x	>	3.7
△	>	5.0
○	>	6.2
X	>	7.6

CULTURE

Urban area

National park or wildlife refuge

Indian reservation

SOURCES OF GEOLOGIC DATA

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STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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