The Ore Bin

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RECENT SHORELINE CHANGES OF THE ALSEA SANDSPIT, LINCOLN COUNTY, OREGON

James E. Stembridge, Jr.
Department of Geography, University of Oregon

Erosion of coastal sandspits has been a recognized hazard in Oregon since the demise of the resort community of Bayocean near Tillamook, which was slowly eliminated by the sea beginning in the late 1920's. Currently, the sandspit at Siletz Bay is undergoing severe erosion which is critically endangering structures along a three-mile beach front. Parially as a result of these experiences with eroding sandspits, some planning agencies, such as the Oregon Coastal Conservation and Development Commission, have considered limiting the construction of housing units on sandspits.

This study is a preliminary analysis of a third Oregon spit, the Alsea near Waldport, with respect to recent shoreline changes, human modifications, and potential impact on current and future settlement (Figure 1).

Unlike the Tillamook and Siletz spits, the Alsea sandspit is presently accreting at a rate as great as 10 feet per year at its southwest margin. Erosion at a rate of as much as 2 feet per year is occurring on the bay side of the spit, however, as well as along the northwestern margins of the spit, where the underlying terrace of semi-consolidated Pleistocene dune deposits is exposed to ocean wave action. The many homes recently constructed on the spit do not appear to be in danger of beach erosion damage at the present time.

Air photographs from the year 1939 show the southern portion of the spit to have been quite flat, with a sparsely vegetated foredune on the order of 15 feet above mean high tide. Sand surface elevations rise to nearly 160 feet near the northern extremes of the three large sand blows that comprise the northern portions of the spit area. Heavy forest surrounding the sand blows and dune-locked lakes are other features of the pre-development landscape (Figure 2).

Within the past few years, residential development has occurred on the spit (Figure 3). Subdivision of the northern portion of the study area began in 1970 with the appearance of "Sandpiper Village," which now includes several dozen single-family and condominium-type units. These structures occupy sites on various terraces bulldozed out of the sand blows. "Sandpiper Village" is at present maintaining part of the northern extreme of the non-forested sand area as parkland.

Figure 1. The Alsea sandspit separates Alsea Bay from the Pacific Ocean. The town of Waldport is at the extreme right.

The "Bayshore" subdivision dates from 1963. It occupies the southern portion of the spit and includes a dredged "marina," a private recreation complex, and, more recently, a large motel. Only a couple dozen houses occupy the nearly one square mile area, although the spit is covered with stabilizing vegetation, and has streets and fire hydrants. A few of the houses occupy the main foredune, which has been cut to a height of about 15 feet above mean high tide (Figure 4).

This main foredune is at least partially bulldozed into shape and rests at a position of up to 100 feet inland of its 1939 location. It is well stabilized with European beach grass (Ammophila arenaria), except where breached for home sites and by trails from the residential area to the surf zone. Its present height is approximately 35 feet above mean high tide level, increasing at a rate of about 0.5 feet yearly as sand accumulates in the vegetation.

The extreme high tide line has moved as much as 300 feet seaward since 1939 (Figure 5). Part of this general accretion is the building of what appears to be a new foredune as much as 300 feet seaward of the 1939 foredune. This developing dune is in the form of a berm 10 feet above the mean high tide line. The interjacent area, between the developing foredune and the main foredune, is filled with scattered, partially exposed driftwood mixed

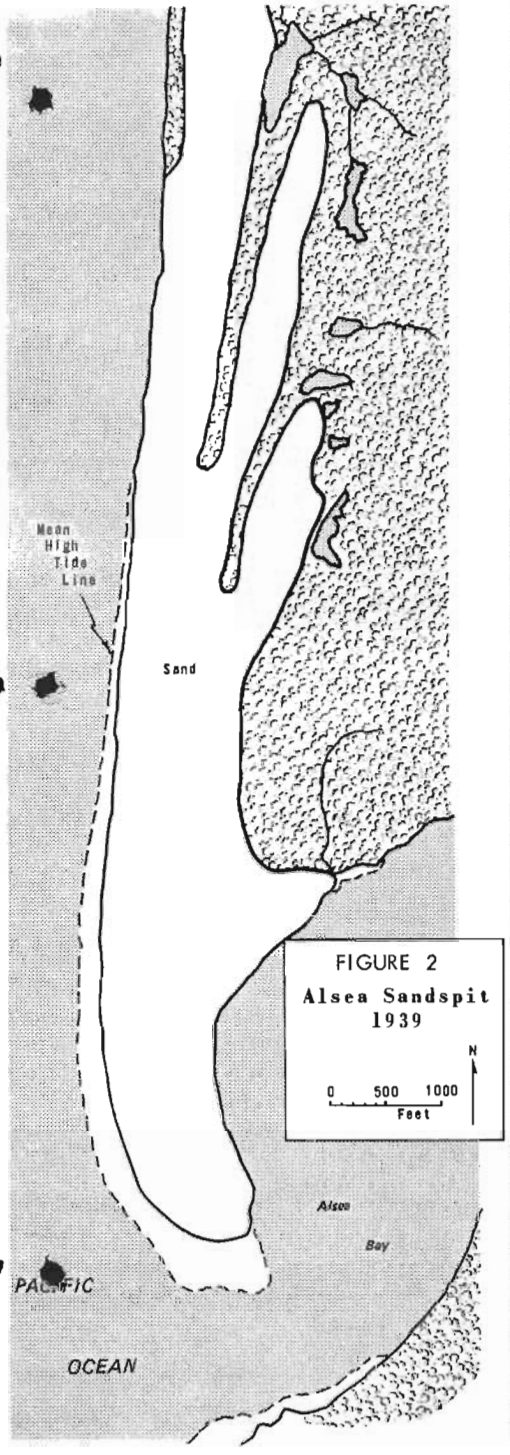

FIGURE 2
Alsea Sandspit
1939

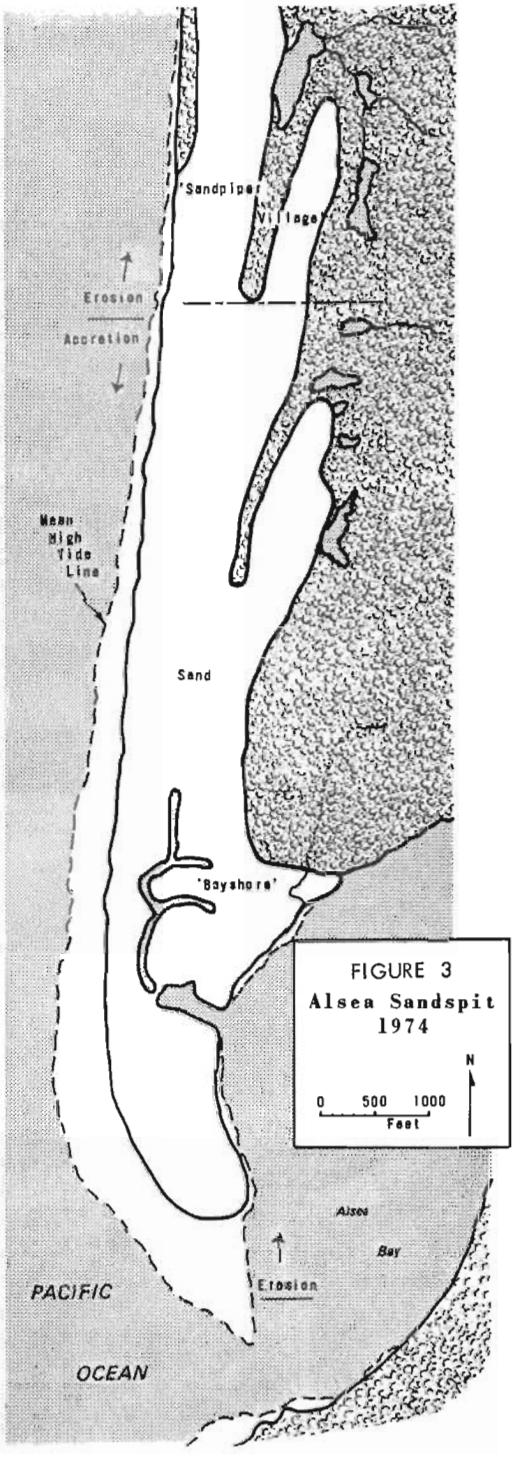

FIGURE 3
Alsea Sandspit
1974

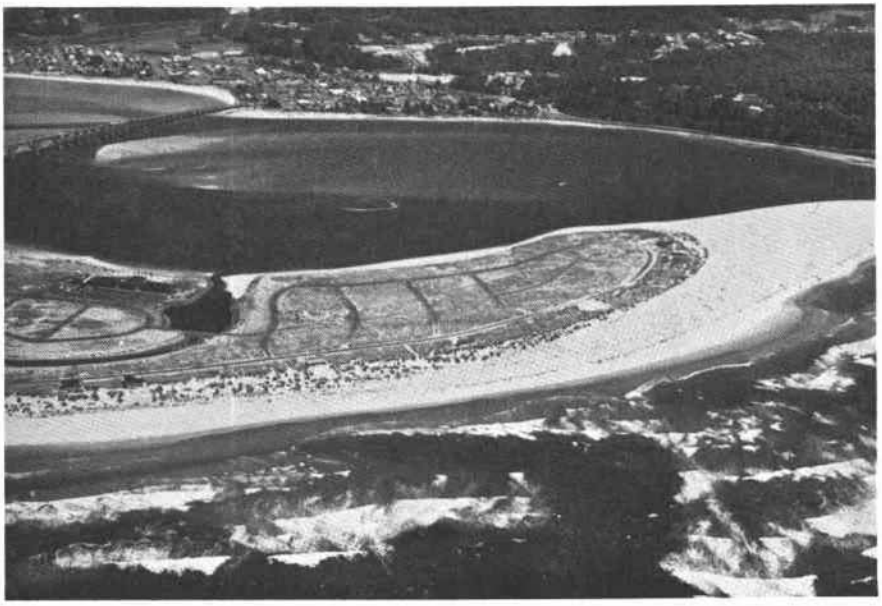

Figure 4. The southern portion of the Alsea sandspit. Note the breached foredune and developing beach berm.

with sand and is not reached by even the highest of high tides. The new foredune is unvegetated, but vegetation has appeared in the interjacent area as much as 200 feet seaward of the main foredune.

The primary process in the accretion of the spit appears to be the deposition of sawlog driftwood combined with sand accumulation. Sand is transported into the area by river and ocean currents from inland sources, from terrace exposures both north and south of the spit, and from the bay side of the spit itself. Also deposited are large numbers of driftwood logs which interrupt the surface wind flow, causing the deposition of wind-blown sand, and retard erosion as well. The vertical limits of this process are on the order of 10 feet above mean high water, the maximum reach of recent storm waves. Additional dune elevation results from deposition associated with the entrapment of wind-blown sand by vegetation. The best example of this latter process is the new 20-foot-high vegetated dune just south of the southernmost portion of the main foredune (Figure 4).

Both the accretion rate and the width of beach that has developed since 1939 decrease in a regular fashion toward the north, reaching zero at a point 1.6 miles north of the spit's present tip (Figure 3). From that point north, erosion prevails, as indicated by bare and frequently inundated driftwood piles, steep unvegetated cliffs, overhanging vegetation, exposed root systems, and small mass movements.

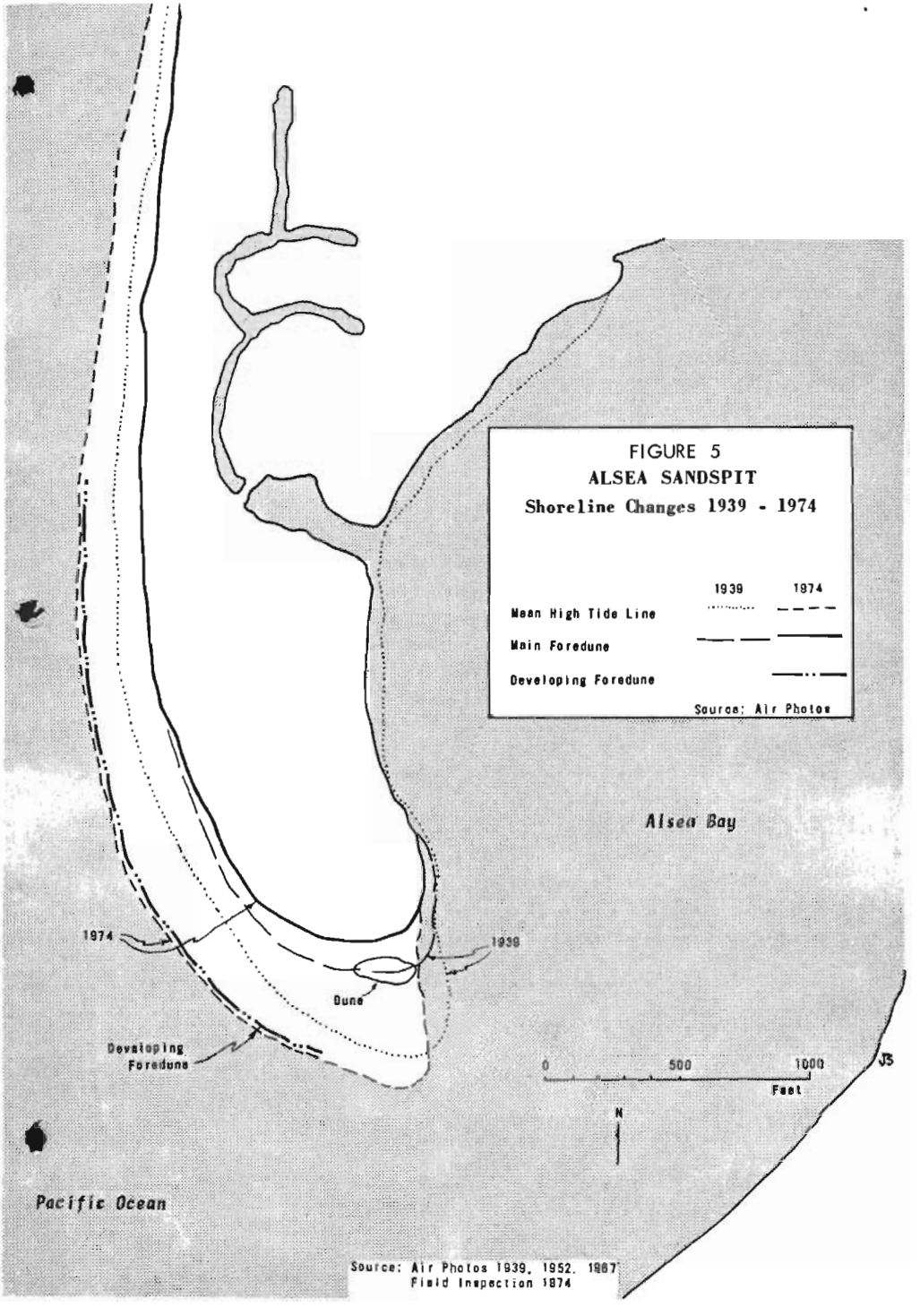
FIGURE 5
ALSEA SANDSPIT
Shoreline Changes 1939 - 1974
1939
1974
Mean High Tide Line
Main Foredune
Developing Foredune
Source: Air Photos
Alsea Bay
1974
1939
Dune
Developing Foredune
0
500
1000
Feet
N
JS
Pacific Ocean
Source: Air Photos 1939, 1952, 1967
Field Inspection 1974

The recently built houses on the spit proper are thus unlikely to experience damage from beach erosion or ocean flooding in the near future, even though some are cut into the main foredune. Those at lower elevations on the spit, however, may be vulnerable to bayside flooding from tsunamis or when storm surges combine with high tides. Blowing sand will continue to be be a problem where the foredune has been breached and where there are expanses of unvegetated sand.

Sandspits have been described as oscillatory in that they may experience irregular cycles of erosion and deposition. If the spit at Alsea is currently prograding, the situation could reverse at any time.

Driftwood deposition as a major factor of shoreline evolution may be a feature unique to the beaches of the Pacific Northwest. Sand supply remains the primary key to the understanding of the entire coastal erosion and deposition process. Sorting and measuring the natural fluctuations in sand movements and the variations caused by human occupation of the coastal zone continue as the major tasks.

References

Cooper, W. S., 1958, Coastal sand dunes of Oregon and Washington: Geol. Soc. America, Mem. 72.

Oregon Coastal Conservation and Development Commission, 1974, Draft policies for geological hazards: OCCDC, January 23, 1974.

Rey, C. C., and Komar, P. D., 1975, The erosion of Siletz Spit, Oregon: Oregon State Univ., School of Oceanography, Ref. no. 75-4.

Schlicker, H. G., Deacon, R. J., Olcott, G. W., and Beaulieu, J. D., 1973, Environmental geology of Lincoln County, Oregon: Oregon Dept. Geol. and Mineral Indus. Bull. 81.

Terich, T. A., and Komar, P. D., 1973, Development and erosion history of Bayocean Spit, Tillamook, Oregon: Oregon State Univ., School of Oceanography, Ref. no. 73-16.

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OREGON LAKES INVENTORY CONTINUES

"Lakes of Oregon, Vol. 2 - Benton, Lincoln, and Polk Counties," by M. V. Shulters, has been issued as an open-file report by the U.S. Geological Survey Water Resources Div., Portland, in cooperation with the State Engineer, Salem. The inventory describes and illustrates, by map and photograph, all natural lakes in the three counties as well as man-made ponds larger than 5 acres. Copies of the report are available in limited supply from the above agencies.

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GOLD SESSIONS PROCEEDINGS TO BE PUBLISHED
Advance Orders Accepted

The Fifth Gold and Money Session and the Gold Technical Sessions, held in conjunction with the Pacific Northwest Metals and Minerals Conference in April, 1975, were a great success, as the many who attended well know. Economists and geologists from various parts of the world participated, and because of the interest shown in both sessions, all of the papers presented, together with a transcript of the Gold and Money Panel Discussion, are being assembled for publication in the form of a proceedings volume. The publication will be for sale at $5.00; advance orders are now being accepted. Please make checks payable to "Gold and Money Session," and send your order to Oregon Department of Geology and Mineral Industries, 1069 State Office Building, Portland, OR 97201.

Papers which are expected to be included in the proceedings are:

Fifth Gold and Money Session

1. Gold and the economy: A study in contrasts, by P. L. Bernstein
2. International monetary outlook and gold related assets, by C. Austin Barker
3. Real money and counterfeit money: Their effect on world conditions, by Eugene Guccione
4. Twentieth century inflation, by John E. Holloway

Gold Technical Sessions

1. Australian gold deposits, by R. Woodall
2. Carlin-type gold deposits, by A. S. Radtke
3. Epithermal transport and deposition of gold, by F. W. Dickson
4. Gold deposits of western Canada, by W. R. Bacon
5. Innovations in cyanidation treatment of low grade gold and silver ores and mine wastes, by H. J. Heinen, R. E. Lindstrom, and D. G. Peterson
6. Lode gold deposits: The case for volcanogenic derivation, by R. W. Hutchinson
7. New ore discoveries of silver and gold in Guanajuato, Mexico, by W. H. Gross
8. Oregon's gold potential, by Len Ramp
9. Placer mining for gold, by W. H. Breeding
10. Recent history of gold exploration in the U.S.A., by J. G. Wargo
11. The gold, silver, and environmental rush of the 1970's, by K. S. Stout

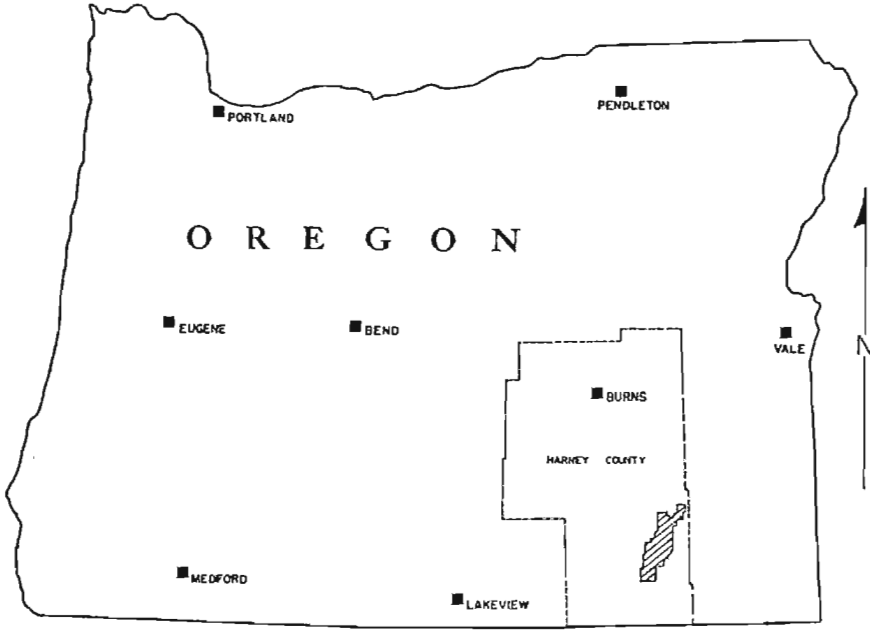
* * * * *

GEOTHERMAL LEASE SALES ANNOUNCED BY BLM

The U.S. Bureau of Land Management is offering 92,900 acres of Federal lands within the Alvord KGRA (Known Geothermal Resources Area) in Harney County for geothermal lease at public auction. The Mickey Hot Springs area and the Alvord Hot Springs area are offered in May and the Borax Lake Hot Springs area on June 5. Auctions are held at the BLM Oregon Office, 729 N.E. Oregon St., Portland. A summary of current and future sales is as follows:

Alvord KGRA	92,900 acres (in 44 leasing units)	
Mickey Hot Springs area,	14 units	May 22, 1975
Alvord Hot Springs area	14 units	May 29, 1975
Borax Lake Hot Springs area	16 units	June 5, 1975
Crump Geyser KGRA	tentative date	July 31, 1975
Vale Hot Springs KGRA	tentative date	August 7, 1975
Klamath Falls KGRA	tentative date	February 26, 1976

Further information and bid forms can be obtained from the Portland BLM office, P. O. Box 2965, Portland, Oregon 97208.



ALVORD KGRA Geothermal - Lease Area

STATE LANDS IN MALHEUR COUNTY LEASED FOR GEOTHERMAL EXPLORATION

Four applications for geothermal resources leases on state-owned lands received final action by the State Land Board on April 24, 1975. Two of the applicants had been waiting in line since February 1974. Rules for leasing had to be adopted and then the applicants were given 120 days to submit their own analysis of the impacts geothermal development would have on the lease site. The applicants' environmental reports were then circulated to interested public agencies and groups for comments. A public hearing was available but no one asked for it.

The lease sites are State school sections in the Alvord Basin, at the foot of Steens Mountain, and near Vale and Adel in Malheur and Lake Counties. Most of the approximately 8,000 acres is intermingled with Bureau of Land Management land and would be operated as units with the BLM's lessees under Federal regulations. The State Department of Geology and Mineral Industries will control the technical operations in exploration and drilling. the State's lease terms are for a 10-year primary term, but rentals escalate from $1 per acre for the first three years to $3 per acre in the fourth year and $5 per acre for each year after that. If a well produces geothermal steam, the State will receive a 10 percent royalty.

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WHERE TO MAKE GEOTHERMAL INQUIRIES

Since the first of the year, when R. G. Bowen resigned from the Department to go into consulting work, the Department's geothermal research and field programs have been directed by Don Hull, geothermal specialist at the Baker field office. Persons seeking geothermal information on a professional basis may obtain assistance by either writing or calling Don Hull, Oregon Dept. of Geology and Mineral Industries Field Office, 2033 First Street, Baker, OR 97814 (telephone: 503-476-2496). Information on drilling regulations and permits to drill for geothermal energy in Oregon can be obtained from V. C. Newton at the Department's Portland office (503-229-5580). General, unspecialized questions on geothermal resources in Oregon should be directed to staff members at the Portland office.

Information on Federal lands open for geothermal leasing can be obtained from the office of the Bureau of Land Management, 729 N.E. Oregon St., P.O. Box 2965, Portland, Oregon 97208. Lease information on State lands is available from Division of State Lands, 1445 State Street, Salem, Oregon 97310.

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IDAHO GEOTHERMAL REPORT ON OPEN FILE

The U.S. Geological Survey has released Open File Report No. 75-130, "Schlumberger soundings and total field measurements in the Raft River geothermal area, Idaho," by Adel A. R. Zohdy, Dallas B. Jackson, and Robert J. Bisdorf. The 87-page report includes four black and white plates at a scale of 1:250,000.

Material from which copy can be made at private expense is available from the three USGS Public Inquiries Offices in Denver, Salt Lake City, and Spokane, and at the Idaho Bureau of Mines and Geology, Moscow, Idaho.

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PLEISTOCENE LAKES IN GREAT BASIN

A map showing the distribution and maximum extent of Pleistocene lakes in the Great Basin has been published by the U.S. Geological Survey as Map I-416. Only ancient shorelines and remnants of these prehistoric lakes now remain. They extend from Fort Rock in eastern Oregon to Salt Lake City, Utah, and south into the Mojave Desert. The map, scale of 1:1,000,000, is for sale by the Branch of Distribution, U.S. Geol. Survey, Federal Center, Denver, Colorado 80225 for 50 cents.

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METAL MINES HANDBOOKS REPRINTED

Three Oregon Metal Mines Handbooks, published a number of years ago by the Department, and long out of print, have been reprinted by a firm in Bellevue, Washington. Those available so far are as follows:

Bulletin 14-A: Baker, Union, and Wallowa Counties, 125 pages
Bulletin 14-C, vol. 2, sec. 1: Josephine County, 229 pages
Bulletin 14-C, vol. 2, sec. 2: Jackson County, 208 pages

The Metal Mines Handbooks were compiled in the late 30's and early 40's when metal mining was particularly active owing to economic and, later, war-time conditions. The bulletins contain a wealth of information unavailable elsewhere on history of development, production, and geology of each mine. Gold, copper, lead, zinc, platinum, mercury, chromium, nickel, molybdenum, and antimony are some of the metals that were prospected for, mined, and produced.

For a price list and further information about available reprints on Oregon and other states, write to: George Srein, American Trading Co., P.O. Box 1312, Bellevue, WA 98009.

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THEY'LL DIG SOME UP SOMEWHERE

Several years ago one of my favorite comic strips featured a dialogue in which one character asked, "What will they do when they run out of minerals?" The reply by another character was "Oh, they'll dig some up somewhere." That reply fairly well epitomizes what so many people actually believe today. However, those of us who work with the problems of finding new mineral resources and who are also concerned with protecting the environment know that it's just not as simple as "digging some up somewhere."

We find ourselves in a society that having already consumed the easily found, high-grade mineral resources, now continues to demand ever-increasing quantities of all varieties of mineral resources. This is a society whose housing, industry, transportation, tools, clothing, household appliances, and energy fuels are all derived from mineral resources. This growing demand is a phenomenon not only of the United States and other industrial nations, but of the underdeveloped countries who are striving to catch up.

Although demands for mineral resources grow, the restraints on availability are increasing more rapidly. Foreign, mineral-exporting nations withhold production and sales in the interest of higher prices and extending longevity. Exploration and development of offshore oil, gas, and mineral resources faces environmental opposition. Wilderness areas are being set aside from man-made development of any kind, particularly mineral extraction. Restrictive zoning in urban and suburban areas is closing out quarries and mines from the very areas where the demand is greatest. Agricultural lands are being given special protection. Dredging minerals from rivers and the offshore is being restricted because it disturbs the fish. There is strong opposition to strip mining of coal (for what it does to the land) and deep mining of coal (for what it does to water) even though our huge coal reserves are the most immediate solution to energy shortages.

Proponents for the restraints on mineral extraction present an appealing list of justifications. But the demand for mineral resources continues unabated. Just where are they going to dig up some more?

Arthur A. Socolow

(Adapted from Pennsylvania Geology, vol. 5, no. 5, 1974)

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ARCHIE CRAFT GOES TO WASHINGTON, D.C.

Archie D. Craft, State director for the Bureau of Land Management in Oregon and Washington since 1967, has been appointed Assistant National BLM Director for Technical Services in Washington, D.C. Technical services include engineering, cadastral survey, resource protection, road rights of way, appraisals, records systems, data processing, and safety.

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GEOTHERMAL WORKSHOP PROCEEDINGS PRINTED

The Proceedings of the Workshop on Environmental Aspects of Geothermal Resources, held at Asilomar, California, November 20-22, 1974, is available. The 123-page bulletin presents the results of six workshop groups, each of whom discussed and evaluated one of six areas of concern related to geothermal development: water quality, air quality, biological impact, hazards, environmental impact, and land-use planning and socio-economic effects. Chairmen of the workshop conference were David N. Anderson and Richard G. Bowen. The volume was prepared by California Department of Conservation, Division of Oil and Gas, and by Oregon Department of Geology and Mineral Industries in association with the National Science Foundation through a research grant. Free copies can be obtained by writing to the Geothermal Section, National Science Foundation, Washington, D.C.

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U.S.G.S. ESTABLISHES NEW RESOURCE AND ENVIRONMENT UNIT

A new unit, the Office of Land Information and Analysis (LIA), has been established by the U.S. Geological Survey to consolidate its previously separate resource and environment programs and activities. The largest program to be incorporated into the new office is EROS (Earth Resources Observation Systems) which processes and distributes data from satellites and aircraft. Other Survey programs to be included into LIA are: Urban Area Studies (UAS), Land Resources and Analysis (LRA), Geographic Applications Program (GAP), Land Use Data and Analysis (LUDA), Resource and Land Investigations (RALI), and Environmental Impact Analysis (EIA).

The goal of the new unit will be to assemble complex earth-science data from its many Survey sources, translate this information into a usable form, and make it accessible to those who must plan and make decisions about the use of land, water, and natural resources.

Dr. James R. Balsley, the Survey's Assistant Director for Land Resources, has been named Chief of the LIA office.

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ICE AGE COMING?

At a conference entitled "The Present Interglacial; How and When Will It End?", a group of scientists interested in the Quaternary concluded that global cooling and related rapid changes of environment, substantially exceeding the fluctuations experienced by man in historical times, must be expected within the next few thousand years or even centuries.

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AVAILABLE PUBLICATIONS

(Please include remittance with order; postage free. All sales are final - no returns. Upon request, a complete list of Department publications, including out-of-print, will be mailed)

BULLETINS

8. Feasibility of steel plant in lower Columbia River area, rev. 1940: Miller . . . $0.40
26. Soil: Its origin, destruction, preservation, 1944: Twenhofel 0.45
33. Bibliography (1st suppl.) geology and mineral resources of Oregon, 1947: Allen. . 1.00
35. Geology of Dallas and Valsetz quadrangles, Oregon, rev. 1963: Baldwin. . . . 3.00
36. Papers on Tertiary foraminifera: Cushman, Stewart & Stewart. vol. 1 $1.00; vol. 2 1.25
39. Geology and mineralization of Morning mine region, 1948: Allen and Thayer . . 1.00
46. Ferruginous bauxite deposits, Salem Hills, 1956: Corcoran and Libbey 1.25
49. Lode mines, Granite mining district, Grant County, Oregon, 1959: Koch . . . 1.00
52. Chromite in southwestern Oregon, 1961: Ramp 3.50
57. Lunar Geological Field Conf. guidebook, 1965: Peterson and Groh, editors . . . 3.50
60. Engineering geology of Tualatin Valley region, 1967: Schlicker and Deacon . . . 5.00
61. Gold and silver in Oregon, 1968: Brooks and Ramp 5.00
62. Andesite Conference Guidebook, 1968: Dole 3.50
64. Geology, mineral, and water resources of Oregon, 1969 . . . . . 1.50
65. Proceedings of the Andesite Conference, 1969: McBirney, editor (photocopy) . . 10.00
67. Bibliography (4th suppl.) geology and mineral industries, 1970: Roberts 2.00
68. The Seventeenth Biennial Report of the State Geologist, 1968-1970 . . . . . 1.00
69. Geology of the Southwestern Oregon Coast, 1971: Dott 3.75
70. Geologic formations of Western Oregon, 1971: Beaulieu 2.00
71. Geology of selected lava tubes in the Bend area, 1971: Greeley. 2.50
72. Geology of Mitchell Quadrangle, Wheeler County, 1972: Oles and Enlows . . . 3.00
73. Geologic formations of Eastern Oregon, 1972: Beaulieu 2.00
75. Geology, mineral resources of Douglas County, 1972: Ramp 3.00
76. Eighteenth Biennial Report of the Department, 1970-1972 . . . . . 1.00
77. Geologic field trips in northern Oregon and southern Washington, 1973 . . . . 5.00
78. Bibliography (5th suppl.) geology and mineral industries, 1973: Roberts and others 3.00
79. Environmental geology inland Tillamook Clatsop Counties, 1973: Beaulieu . . . 6.00
80. Geology and mineral resources of Coos County, 1973: Baldwin and others . . . 5.00
81. Environmental geology of Lincoln County, 1973: Schlicker and others 7.50
82. Geol. hazards of Bull Run Watershed, Mult. Clackamas Cos., 1974: Beaulieu . . 5.00
83. Eocene stratigraphy of southwestern Oregon, 1974: Baldwin 3.50
84. Environmental geology of western Linn Co., 1974: Beaulieu and others 8.00
85. Environmental geology of coastal Lane Co., 1974: Schlicker and others 7.50
86. Nineteenth Biennial Report of the Department, 1972-1974 . . . . . 1.00

GEOLOGIC MAPS

Geologic map of Oregon west of 121st meridian, 1961: Wells and Peck $2.00; mailed 2.25
Geologic map of Oregon (12" x 9"), 1969: Walker and King 0.25
Geologic map of Albany quadrangle, Oregon, 1953: Allison (also in Bulletin 37) . . 0.50
Geologic map of Galice quadrangle, Oregon, 1953: Wells and Walker 1.00
Geologic map of Lebanon quadrangle, Oregon, 1956: Allison and Felts. 0.75
Geologic map of Bend quadrangle, and portion of High Cascade Mtns., 1957: Williams 1.00
GMS-1: Geologic map of the Sparta quadrangle, Oregon, 1962: Prostka 1.50
GMS-2: Geologic map, Mitchell Butte quad., Oregon: 1962, Corcoran and others . . 1.50
GMS-3: Preliminary geologic map, Durkee quadrangle, Oregon, 1967: Prostka . . . 1.50
GMS-4: Gravity maps of Oregon, onshore & offshore, 1967: Berg and others
[sold only in set] flat $2.00; folded in envelope 2.25
GMS-5: Geology of the Powers quadrangle, 1971: Baldwin and Hess 1.50
GMS-6: Prelim. report, geology of port of Snake River Canyon, 1974: Vallier . . . 5.00

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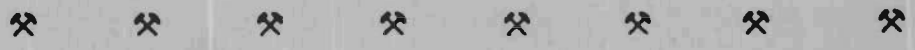

Available Publications, Continued:

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18. Radioactive minerals prospectors should know, 1955: White and Schafer	$0.30
19. Brick and tile industry in Oregon, 1949: Allen and Mason	0.20
21. Lightweight aggregate industry in Oregon, 1951: Mason	0.25
24. The Almeda mine, Josephine County, Oregon, 1967: Libbey	2.00

MISCELLANEOUS PAPERS

1. Description of some Oregon rocks and minerals, 1950: Dole	0.40
2. Oregon mineral deposits map (22 x 34 inches) and key (reprinted 1973): Mason	0.75
4. Rules and regulations for conservation of oil and natural gas (rev. 1962)	1.00
5. Oregon's gold placers (reprints), 1954	0.25
6. Oil and gas exploration in Oregon, rev. 1965: Stewart and Newton	1.50
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7. (Supplement) Bibliography of theses, 1959 to Dec. 31, 1965: Roberts	0.50
8. Available well records of oil and gas exploration in Oregon, rev. 1963: Newton	0.50
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13. Index to The ORE BIN, 1950-1969, 1970: Lewis	0.30
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16. Mosaic of Oregon from ERTS-1 imagery, 1973:	2.00

OIL AND GAS INVESTIGATIONS SERIES

1. Petroleum geology, western Snake River basin, 1963: Newton and Corcoran	2.50
2. Subsurface geology, lower Columbia and Willamette basins, 1969: Newton	2.50
3. Prelim. identifications of foraminifera, General Petroleum Long Bell no. 1 well	1.00
4. Prelim. identifications of foraminifera, E. M. Warren Coos Co. 1-7 well: Rau	1.00

MISCELLANEOUS PUBLICATIONS

Landforms of Oregon: a physiographic sketch (17" x 22"), 1941	0.25
Geologic time chart for Oregon, 1961	free
Postcard - geology of Oregon, in color . . . . 10¢ each; 3 - 25¢; 7 - 50¢; 15 -	1.00
Oregon base map (22 x 30 inches)	0.50
Mining claims (State laws governing quartz and placer claims)	0.50
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