STATE OF OREGON

CHRIS L. WHEELER
STATE ENGINEER

GROUND - WATER LEVELS 1967 - 1968

BY

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STATE-FEDERAL COOPERATIVE PROGRAM

Measurements from selected wells in the United States are published by the Geological Survey at five-year intervals in a series of water-supply papers titled "Water Levels and Artesian Pressures in Observation Wells in the United States: Part 5, Northwestern States".

Under the state cooperative program, funds expended by state personnel in basic data collection and the publication of this report are matched by the federal government and are expended by the Geological Survey for other hydrologic studies in Oregon.

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OREGON GROUND-WATER LEVELS

by

Wm. S. Bartholomew and Robert DeBow

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INTRODUCTION

Ground water is one of Oregon's most valuable resources. Adequate information relating to the source and quantities of ground water now used in Oregon is urgently needed for ground water management. Studies of divergent geologic, hydrologic, topographic, and climatic factors in Oregon must be accelerated for they broadly affect the occurrence of ground water and surface run-off.

Ground water uses today in Oregon serve irrigation, industrial, municipal, rural domestic, and stock watering needs. Heating and air-conditioning are also important uses of ground water in Oregon's larger cities. These uses are increasing rapidly each year. Therefore, the growing concern over present day water problems is certainly justified.

Nationwide, the rate of use of ground water has expanded from 30 billion gallons per day in 1950 to 45 billion gallons per day in 1955, and 61.5 billion gallons per day is used at the present time. In the future, greater dependence will be placed on ground water to serve our water needs. Throughout the United States more than one-third of the total flow of all surface streams is discharged from ground water reservoirs. Therefore, in developing either surface water or ground water, we must be concerned about the effects of increased water use on the total water supply.

Ground water is only a part of the earth's continuous hydrologic cycle. This fixed quantity of the earth's water supply swirls endlessly from the oceans to the sky then to the lands and finally it returns again to the ocean. The ocean is the center of the water cycle and the sun, our solar furnace, distills the water vapor from the ocean brine. Winds carry the water vapor over the lands to sustain life on earth. Precipitation falling on the earth's surface flows over and through the rock formations and throughout time, a great quantity of water has been stored as ground water bodies within the earth. These great bodies of stored ground water are next in size to the earth's oceanic reservoirs.

Some of the water falling to earth soaks into the ground and after replacing soil moisture, it continues to move downward until it

reaches the zone of saturation. In this zone, all the void spaces in the rock formations are filled with water. The upper surface of the ground water body is called the "water table". During the wet and dry seasons, the position of the water table fluctuates in response to hydrostatic pressures. Hydrostatic pressure causes ground water to move down gradient from a point or area of recharge to a point or area of discharge. Great quantities of ground water remain in storage in the ground as the water migrates toward areas of natural discharge such as springs and streams. Much of the base flow of surface streams is sustained by the natural discharge of ground water reservoirs during the summer seasons. Evaporation and transpiration losses are also forms of natural ground water discharge.

Nature seeks to maintain a balance between ground water discharge and ground water recharge. When heavy rains increase the amount of annual recharge to a water body, the water level will rise and force an equal amount of ground water to discharge. When recharge is distributed evenly throughout the year, the water table remains relatively stationary. However, in Oregon, the seasonal ground water recharge occurs during the winter and spring months. The arrival of winter rain and snow brings about a seasonal fluctuation of the water table. A steeper slope or gradient on the water table is required during the recharge period to move the additional quantity of water received. The required gradient is produced by the rise in the position of the water table. Recharge is usually at a minimum during the Summer and Autumn months and the regional water tables decline to establish a lower gradient. Long periods of above average precipitation result in higher water table positions and during long periods of below average precipitation the water table will decline.

The operation of a well or a group of wells disturbs the natural balance between recharge and discharge. The operation of wells, imposes an artificial discharge on the regional ground water body. Nature must adjust to this situation. There must be either a reduction in the amount of natural ground water discharge, or there must be an increase in the amount of annual recharge. Such changes are reflected by a change in the position of the water table. When pumping exceeds the total amount of the annual recharge, nature forces a new balance on the system. The water table will continue to decline each year until it becomes physically impossible to withdraw more water than is recharged each year.

Two major factors control the availability of ground water. One is an adequate climatic environment capable of providing water for recharge. The second factor is the occurrence of permeable geologic formations capable of absorbing, storing, and transmitting ground water.

The Cascade Mountains divide Oregon into two climatic provinces. The area lying west of the Cascade Mountains has a temperate marine climate characterized by mild temperatures and abundant precipitation. Here the precipitation occurs during the Winter and Spring months averaging 30 to 40 inches in the Willamette Valley and reaching in excess of 120 inches in the coastal mountain areas. Central and eastern Oregon is dominated by a continental type climate. More severe temperature changes occur in this area. Reduced amounts of precipitation occur in the rain shadow of the Cascade Mountains. In some areas of eastern Oregon there is not sufficient

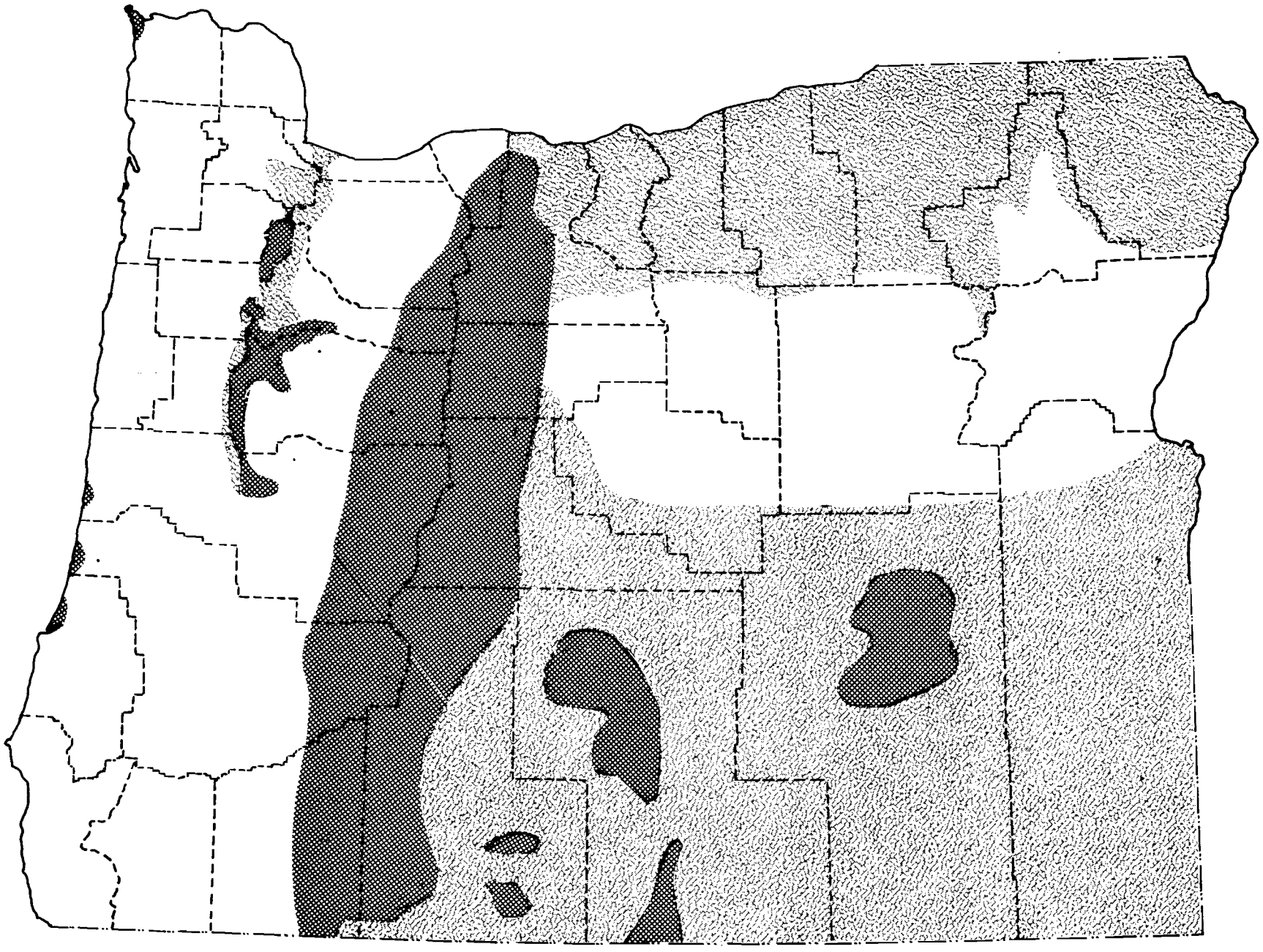
precipitation to replace soil moisture; therefore, recharge to some ground water bodies is very low or non-existent. Many intermontane basins receive less than 8 inches of precipitation each year. Higher elevations of the Blue Mountains receive more than 30 inches of precipitation.

The occurrence of permeable rock formations capable of storing and transmitting ground water varies greatly throughout the state. Oregon geology is dominated by volcanic rock formations of every description. The Coast Range Mountains are formed by fine-grained marine sediments and related volcanic rocks. The Klamath Mountains to the south include impervious metamorphic rocks that have poor water bearing properties. Oregon is not a water rich state and we are not as well endowed with areas of large ground water potential as might be expected. A map indicating areas of relative permeability is shown in Figure 1. With the exception of the Willamette Valley, the area west of the base of the Cascade Mountains is composed of geologic units that are very impermeable. In contrast, volcanic rock units of the Central Cascades are quite permeable. Formations of reduced permeability occur in some areas of the Columbia Plateau and in areas of southeastern Oregon. An extensive 85 mile wide band of fine-grained, impermeable formations extend eastward from central Oregon to the Idaho border through the John Day and Burnt River drainage basins. Some moderately permeable formations are located in the southeastern portion of Oregon.

Young volcanic rocks of the Cascade Mountains receive large amounts of recharge and are excellent water bearing formations. Many large springs occur on the flanks of the Cascade Mountains. The head waters of the Metolius River is but one example. Coarse alluvial sediments have been deposited by swift streams flowing from the western slopes of the Cascade Mountains. These sand and gravel deposits form the main water bearing formations found along the central and eastern portions of the Willamette Valley. Low gradient streams draining the soft marine clay formations of the Coast Range enter the Willamette Valley from the west. The contrast in the water bearing characteristics of these alluvial sedimentary deposits from one side of the valley to the other is responsible for the great difference in availability of ground water within the respective areas.

The impermeable rock units of the Coast Range Mountains and the Klamath Mountains reject large amounts of precipitation to streams. The geologic environment of these regions directly affect the limited quantity and poor quality of ground water in the area. Coastal dunes and terraces offer the best potential for ground water development along the Oregon Coast. Salt water encroachment is a constant threat in the coastal areas and will require careful monitoring, planning, and supervision.

The Columbia Slope plateau of north central and northeastern Oregon is made up of the Columbia River basalt formation. These lava rocks have engulfed more than 200,000 square miles of the Pacific Northwest. Permeable interflow zones between individual lava flows are often capable of yielding moderate to large supplies of ground water. Precipitation in this area is low and vigilance will be required to prevent over-draft of the deep ground water supply. Several municipalities on the Columbia Slope are dependent on deep wells for their daily water supply.



HIGH PERMEABILITY
MODERATE PERMEABILITY
LOW PERMEABILITY

Fig. 1

Ground water is very limited in the tight, tuffaceous sediments located in the central mountain areas of eastern Oregon. The Clarno and John Day formations provide very poor ground water storage and support few wells.

Closed intermontane basins at Baker, Wallowa, Lakeview, and La Grande contain permeable rock formations capable of moderate to large yields of ground water.

Southeastern Oregon's basin and range province receives low precipitation yet wells in the area are often moderate to large capacity structures. Due to the limited recharge capability, local problems of overdraft are expected to occur in the future. Continued observation wells and monitoring programs are necessary to assure an early warning of excessive water level declines in Oregon.

Ground Water Problem Areas

In Oregon and throughout the United States, the use of ground water has doubled during the last 15 year period. Heavy pumpage in some areas of Oregon has created five critical ground water areas.

Oregon's first critical ground water area developed in Cow Valley of northern Malheur County. The State Engineer set controls on the amount and use of ground water in the valley and limited production to 5,000 acre feet per year. During 1966 and 1967, wells pumped 4,696 and 4,211 acre feet, respectively. Water levels in the valley have remained stable and controls have been effective in preventing further water level decline in the valley. The State Engineer's order declaring Cow Valley a critical ground water area was appealed and has remained in the courts for the past nine years.

The second critical ground water area developed in the vicinity of The Dalles, Oregon about 1960. Water levels in wells of the area decline 5 to 6 feet each year. The State Engineer's order declaring the area critical and setting control provisions was stayed by the Circuit Court of Wasco County. The case was delayed six years preventing state control of the declining water body. Subsequently, the availability of Columbia River water from the new Bureau of Reclamation project of The Dalles has resulted in reduction of pumpage from irrigation wells. Reduced pumpage for irrigation has resulted in a slower rate of decline of 1.5 to 2 feet per year during the last two years.

A third critical area has been identified on the Columbia Slope near Ordnance-Umatilla area. Water levels in deep wells 400 feet or more in depth have been declining annually at a rate of 4 to 6 feet per year since 1960. Boundaries have not been set for this critical area to date. It is expected that adjacent areas near Butter Creek and the State Industrial Park near Boardman will be included in the critical ground water determination. Carbon 14 methods of dating well water have indicated the relative ages of water sampled in three wells of the area. These water samples were collected by Jim Robison, a ground water geologist with the U. S. Geological Survey, as part of the state cooperative program with that agency. Laboratory results

indicate that water in shallow wells less than 300 feet deep develop water of modern age dated about 1950. Water in deeper wells, about 450 feet deep, last contacted the atmosphere about 6,800 years ago. And water in deep wells of 800 to 1000 feet deep, last contacted the atmosphere 27,300 years ago. It is concluded that recharge to the deep aquifers is either very limited or non-existent, or the water developed in deeper zones is being transmitted over great distances from recharge areas. At present, we believe the area is using fossil water which is not being replaced by recharge.

A fourth critical ground water area has developed in the vicinity of Tigard near Bull Mountain and Cooper Mountain, Washington County, Oregon. Water levels continue to decline at an increasing rate. The average decline of 6 to 8 feet per year has increased 10 feet per year in numerous wells located on Bull Mountain. This area must develop an outside source of water within the next few years for the purpose of ground water recharge or direct appropriation. Study of this area is continuing to determine the boundaries of the affected area.

The Harbor-Brookings area has experienced some seasonal ground water problems during the irrigation season. Limited storage aquifers of this area are not capable of storing a sufficient amount of ground water for heavy irrigation requirements. Though the thin ground water body fills to rejection each year, areas of heavy pumpage experience a shortage of stored ground water in the late irrigation season. Work continues in the study of this problem.

The use of drain holes in central Oregon near Bend, Redmond, and Madras continues to threaten the ground water supply of the area. Septic effluent is discharged directly into wells 15 to 400 feet in depth. Mr. Jack E. Sceva, ground water geologist with the Federal Water Pollution Control Administration, has recently completed a study of this problem. His report entitled, "Liquid Waste Disposal in the Lava Terrain of Central Oregon", was published by the Department of the Interior in April of 1968. Special well construction standards may be required for wells in the subject area to protect the ground water resources.

A large number of uncontrolled, flowing artesian wells continue to waste millions of gallons of ground water in Oregon each year. Extensive and costly well repairs are needed to prevent the waste of ground water. Little progress has been made in requiring well owners to repair and control flowing artesian wells. No state funds are available for such repairs of well abandonment work.

Ground Water Mining and Artificial Recharge

The mining of ground water resources in Oregon has already begun in the five ground water areas previously described. It should be clear to everyone that without an outside source of recharge water, the economy of such areas will start to decline within a decade or two. We face the great challenge of sound, practical, and effective water management. We must soon enter the field of ground water recharge and ground water reservoir management. Spreading grounds and injection

wells will be needed to supply and store surface water underground. Waters stored in ground water reservoirs are not subject to contamination by radio active fallout, pesticides, and dust. There is no fear of loss of water due to evaporation and the storage areas are not reduced by sedimentation. Ground water reservoirs can be filled during periods of excess surface water and can provide stored water when surface water is not available. The storage capacity of sub-terrainian reservoirs is hundreds of times larger than man made structures and they already exist and are thus less expensive to use.

Ground water management will require study of the legal aspects involved in these operations. All water users should be expected to share the costs of insuring a permanent water supply. Numerous legal problems are expected to arise concerning recharge projects, a few of these are noted as follows: (1) If imported water is to be obtained from surface streams, on what basis can the appropriator establish a right to draw the specified amount of water annually and be protected from interference by others? (2) If an agency brings water to an area and replenishes the aquifers with the water, on what basis can the agency recover the costs from water users who draw from the replenished formations? (3) What power should the agency have? (4) Should it levy assessments in proportion to benefits received? (5) If the agency is to be financed by a charge on each well proportionate to the volume of water pumped, should the rates be regulated by an outside agency or commission? These problems face Oregon today and the Legislature must soon address itself to the solutions that can provide effective legislation and controls for ground water recharge projects.

Cooperative Ground Water Investigations

The State of Oregon has been engaged in cooperative fund programs with the United States Geological Survey since 1905. State funds are made available to the Geological Survey for ground water investigations and are matched dollar-for-dollar with Federal funds. State budget cuts have resulted in reduction of Federal staffing of ground water geologists for Oregon's cooperative program.

The following listed reports prepared under the cooperative program were released and published by the United States Geological Survey during the biennium:

1. Geology and Water Resources of the French Prairie Area, by Don Price, 1967, Water Supply Paper 1833.

2. Artificial Recharge Through a Well Tapping Basalt Aquifers at The Dalles, Oregon, by B. L. Foxworthy and C. T. Bryant, 1967, Water Supply Paper 1594E.

R. C. Newcomb, research staff scientist and ground water geologist with the Geological Survey, has continued his program of research on the geology and ground water resources of the Columbia River Basalts in Oregon and Washington. Valuable planning and development information has been obtained from this work. A report is under preparation at the present time and is near completion.

A project of updating the ground water report of the Harney Basin is currently in progress. Basic data on the geology and ground water in the lower Santiam River Basin has been collected by Don Helm, geologist with the U. S. Geological Survey. This data will be published by the State Engineer as Ground Water Report No. 13. An interpretive report is to be published by the U. S. Geological Survey at a later time. Work continues on ground water studies in the Medford-Ashland areas and a new project is planned for ground water studies in the vicinity of Eugene and Springfield, Oregon.

Public information and library services maintained by both the Geological Survey and this office continue to be increasingly important means of disseminating ground water information to the general public. Telephoned and written requests for such information are received daily by both agencies.

Ground Water Reports

The State Engineer has published two ground water reports during the year, bringing the total number of reports to fourteen. The reports are listed as follows:

Ground Water Report No. 13 - Records of Wells, Water Levels, and Chemical Quality of Water in the Lower Santiam River Basin, Middle Willamette Valley, Oregon, by D. C. Helm

Ground Water Report No. 14 - Ground Water Levels - 1966 by Wm. S. Bartholomew and Robert DeBow

Observation Well Program

The observation well program consists of the periodic measurement of the depth to water or artesian pressure in water wells located throughout the state. This report contains hydrographs for 200 of these observation wells. For convenience in using this report, the depicted hydrographs have been grouped together by area.

Each area has been assigned a reference number as shown on Figure 2, Page 12. The area name and reference number is shown at the top of each page of hydrographs. A list of all observation wells is recorded on page 116. Water level records and descriptions of the individual wells measuring point for each well in the observation net can be obtained from the State Engineer.

During the year, 25 wells were added to the statewide observation well net while 17 wells were discontinued. This brings the total number of wells in the net to 842. Water levels in these wells are measured periodically each year to determine changes in the amount of ground water storage within each ground water reservoir. Results of these water level measurements are published at the end of each calendar year and provide a basis for giving an early warning of any serious depletion of ground water storage. Such data also provides valuable background information for future water resource investigations.

Frequency of Measurement	Number
Continuously (recording device)	2
Monthly or more often	21
Four to six times per year	819
Total	842

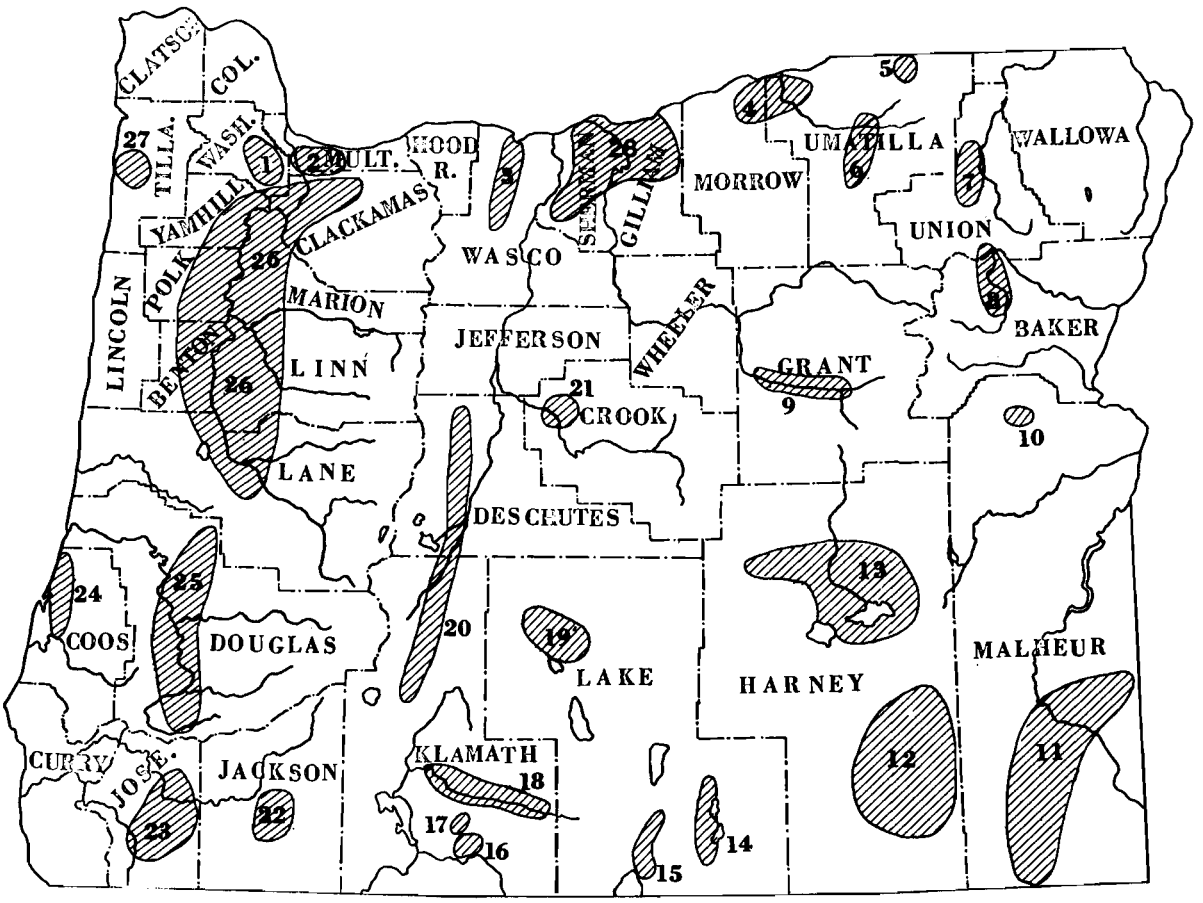
The number of wells being measured within each county is listed as follows:

County	Number of Observation Wells	County	Number of Observation Wells	County	Number of Observation Wells
Baker	13	Harney	60	Morrow	33
Benton	14	Hood River	3	Multnomah	22
Clackamas	37	Jackson	5	Polk	15
Clatsop	2	Jefferson	5	Sherman	3
Columbia	3	Josephine	11	Tillamook	18
Coos	5	Klamath	61	Umatilla	52
Crook	10	Lake	105	Union	15
Curry	4	Lane	29	Wallowa	2
Deschutes	7	Lincoln	5	Wasco	38
Douglas	8	Linn	40	Washington	38
Gilliam	4	Malheur	53	Wheeler	1
Grant	13	Marion	86	Yamhill	22

-ACKNOWLEDGEMENTS-

We gratefully acknowledge the generous aid, cooperation, and assistance which has been extended to personnel of this office by the Pacific Power and Light Company, the Harvey Aluminum Company, General Foods, Incorporated, and the city water departments of Arlington, Dalles City, Milton-Freewater, Pendleton, Hermiston, Salem, and Tigard, Oregon, and the personnel of the Umatilla Army Depot at Ordnance, Oregon. We also appreciate the assistance of many well owners and licensed water well drillers and contractors for making wells available for measurement in this program.

Figure 2



Ground Water Areas Represented By Hydrographs In This Report

1. Tualatin Valley
2. Portland Metropolitan Area
3. The Dalles Area
4. Columbia Slope Area
5. Milton-Freewater Area
6. Pendleton-Pilot Rock Area
7. Grande Ronde Valley
8. Baker Valley
9. Upper John Day Valley
10. Cow Valley Area
11. Southern Malheur Area
12. Southern Harney Area
13. Harney Basin
14. Warner Valley
15. Goose Lake Basin
16. Yonna Valley
17. Swan Lake Valley
18. Sprague River Valley
19. Fort Rock Area
20. Chemult-Lapine-Sisters Area
21. Prineville Area
22. Medford Area
23. Grants Pass Area
24. Coos Bay Area
25. Umpqua River Valley
26. Willamette Basin
27. Tillamook Area
28. Gilliam-Sherman County

WELL NUMBERING SYSTEM

The location of wells listed in this report is designated by number symbols. Each number or symbol indicates the position of the well as referenced to the official rectangular survey of public land.

In the well number 8/3W-10C(1), the portion of the number preceding the hyphen indicates the township and range (T. 8 S., R. 3 W.) referenced to the Willamette base line and Willamette meridian. Since most of Oregon lies south of the Willamette base line and east of the Willamette meridian, the letter S for south and E for east are omitted from the location number. Only the letters N for north and W for west are shown in the numbers for wells lying north and west of the base line and meridian. The first number after the hyphen indicates the section, Section 10. The letter following the number refers to a particular 40 acre tract within the section as shown in figure 3. The final digit indicates the serial number of the well with respect to the other wells located within the same 40 acre tract.

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

Figure 3

For example, the well numbered 27/17-22R(2) indicates the well is in the SE¼ SE¼, Section 22, Township 27 South, Range 17 East and is the second well noted in this 40 acre tract.

MEASUREMENT OF WATER LEVELS IN WELLS

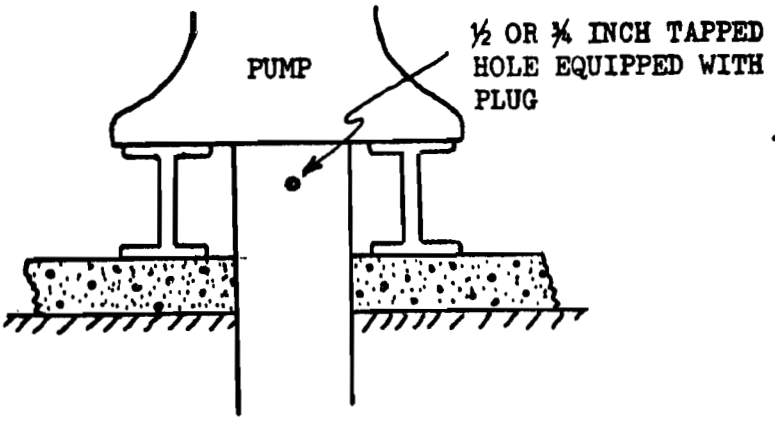
One of the most accurate methods of measuring the depth to water in a well is use of a weighted steel tape. Light blue carpenter's chalk is rubbed on the last few feet at the lower end of the steel tape and the

chalked end of the tape is lowered into the well. The amount of tape that is submerged can be easily determined by the water line on the chalked end of the tape. This submerged distance is to be subtracted from the total amount of tape lowered into the well.

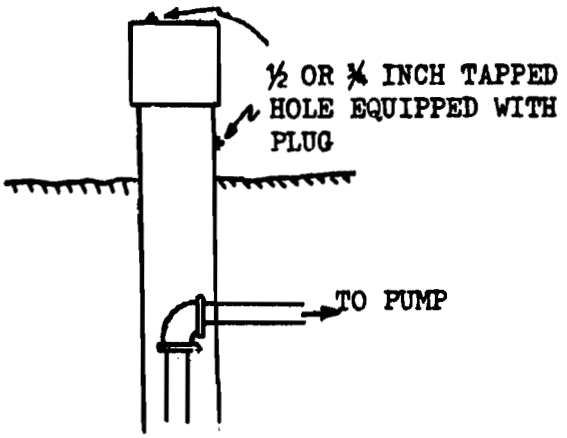
Cascading water in some wells makes it impossible to obtain accurate water level measurements by the tape method. In such wells, a commercial electric tape or air line and gage should be used. The diagrams on page 15 depict various methods of installing access ports and the installation of an air line.

SUGGESTED METHODS OF INSTALLING ACCESS PORTS, PRESSURE GAUGES, AND AIR LINES FOR MEASURING WATER LEVELS IN WELLS

Figure 4



ACCESS PORT FOR MEASURING DEVICE



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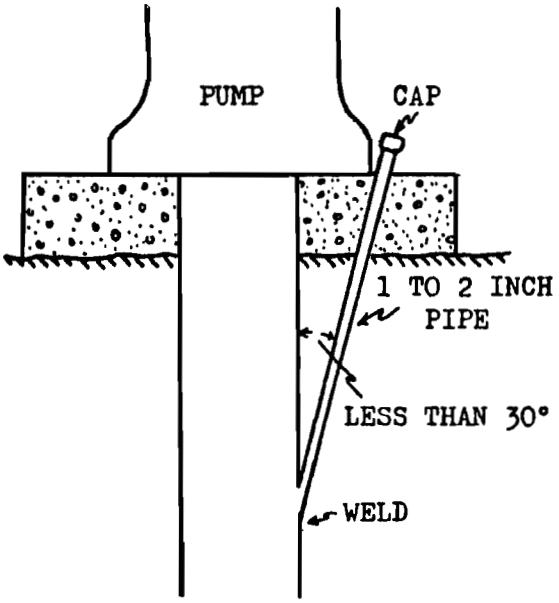

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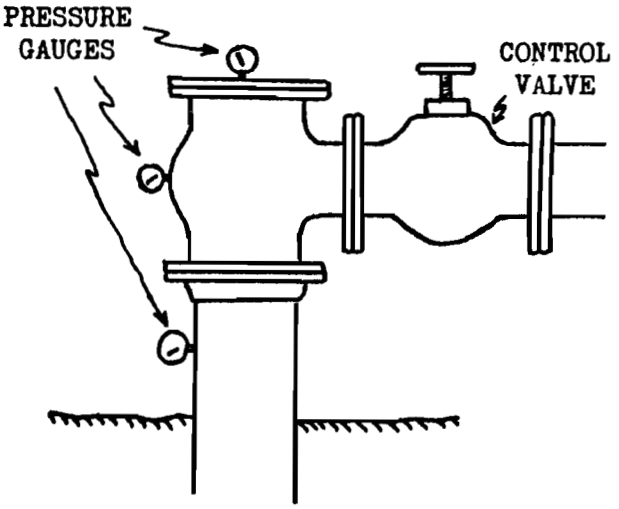
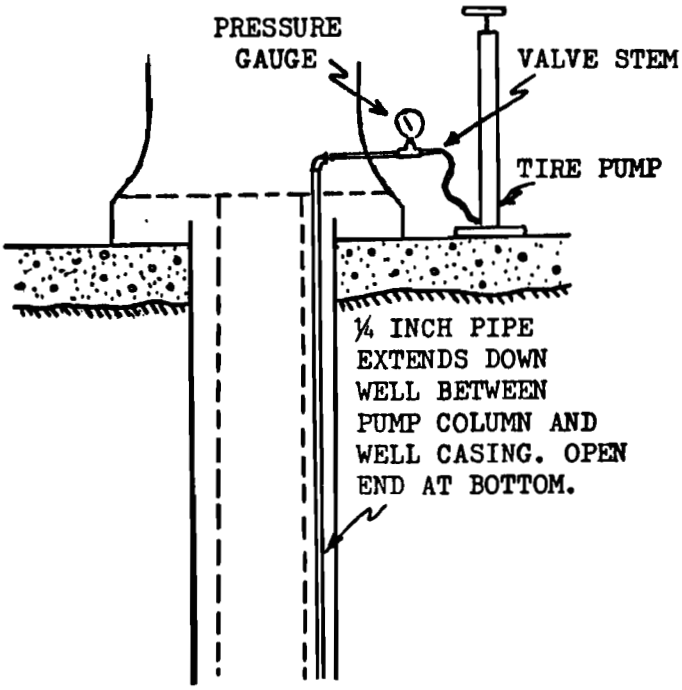


POSSIBLE LOCATION FOR PRESSURE GAUGES ON AN ARTESIAN WELL



AIR LINE INSTALLATION

AN AIR LINE INSTALLATION IS RECOMMENDED WHERE THE WATER LEVEL LIES AT A CONSIDERABLE DEPTH BELOW LAND SURFACE. THE AMOUNT OF AIR PRESSURE THAT CAN BE BUILT UP INSIDE THE AIR LINE WILL BE EQUAL TO THE DEPTH OF WATER STANDING ABOVE THE BOTTOM OF THE AIR LINE. THE EXACT DEPTH TO THE BOTTOM OF THE AIR LINE IS REQUIRED TO OBTAIN AN ACCURATE MEASUREMENT OF THE WATER LEVEL IN THE WELL. ONE POUND PER SQUARE INCH PRESSURE EQUALS 2.31 FEET OF WATER.

TUALATIN VALLEY (1)

The Tualatin Valley is a broad basin that has been partially filled with fine-grained lake deposits composed chiefly of silt and clay. The bedrock, which forms the surrounding hills and underlies the lake deposits, is a series of basaltic lava flows known as the Columbia River Basalt. Ground water generally occurs in the broken contact zones between individual lava flows in the basalt formation. The basaltic lava flows are underlain by marine sedimentary rocks that are generally barren of notable water supplies. Extensive weathering of the upper surface of some basalt flows has reduced the rock to clay which restricts recharge to the aquifers at depth.

Water levels in most wells throughout the Tualatin Valley recover each spring to the previous spring high position. Some of the wells developing water from the basalt in the Cooper Mountain area have shown a decline in recent years as indicated by the hydrographs of wells 1/1W-19R(3) and 1/2W-26F(1). Water level declines are also occurring in some of the deep basalt wells in the Tigard and Bull Mountain areas.

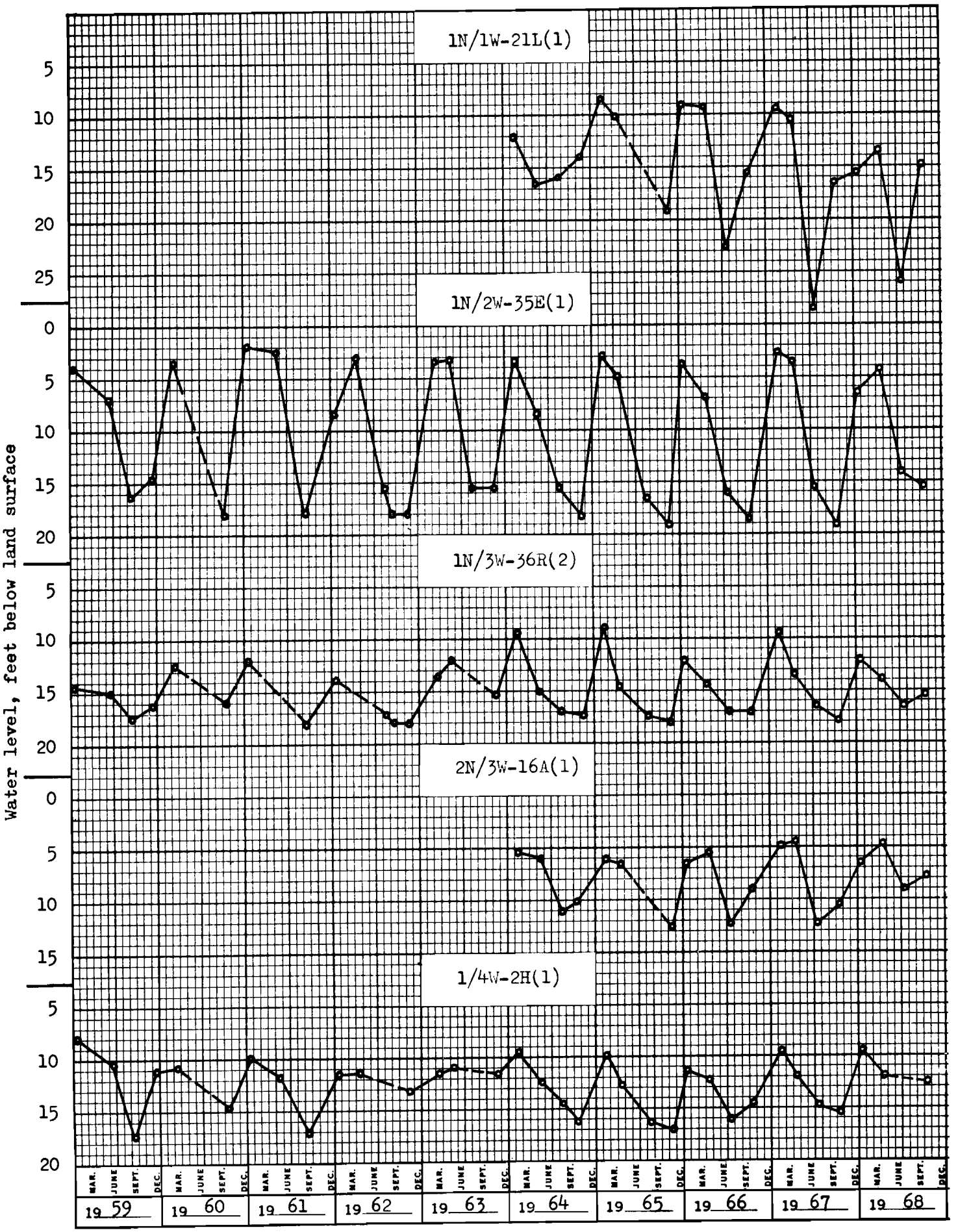
OBSERVATION WELLS

1N/1W-21L(1)	(Cecil C. Schaefer) is a 390-foot drilled well in basalt located about 8 miles NE of Hillsboro.
1N/2W-35E(1)	(E. L. Lewis) is a 23-foot dug well in alluvial sand at Orenco. Periodic water level measurements available from 1951 to date.
1N/3W-36R(2)	(Terminal Ice & Cold Storage Company) is a 171-foot drilled well in alluvial sand at Hillsboro. Periodic water level measurements available from 1951 to date.
2N/3W-16A(1)	(Dennis Hall) is a 150-foot drilled well in alluvial gravel deposits located about 4 miles NE of Banks.
1/4W-2H(1)	(Myron Sheeler) is a 78-foot drilled well in alluvial gravel deposits located about 2 miles west of Forest Grove. Water level measurements available from 1951 to date.

REFERENCES

Hart, D. H. and Newcomb, R. C., 1965, Geology and Ground Water of the Tualatin Valley, Oregon: U. S. Geological Survey Water Supply Paper 1697

TUALATIN VALLEY (1)



TUALATIN VALLEY (1)

Ground water in the alluvial aquifers is generally replenished each year and no problems of declining water levels have developed in these materials. At places in the valley, the water table recovers to land surface and additional water, which is available for recharge, is rejected and flows off as surface water.

OBSERVATION WELLS

2/1W-3Q(1) (Leonard S. Davis) is a 218-foot drilled well in basalt located about one mile west of Tigard.

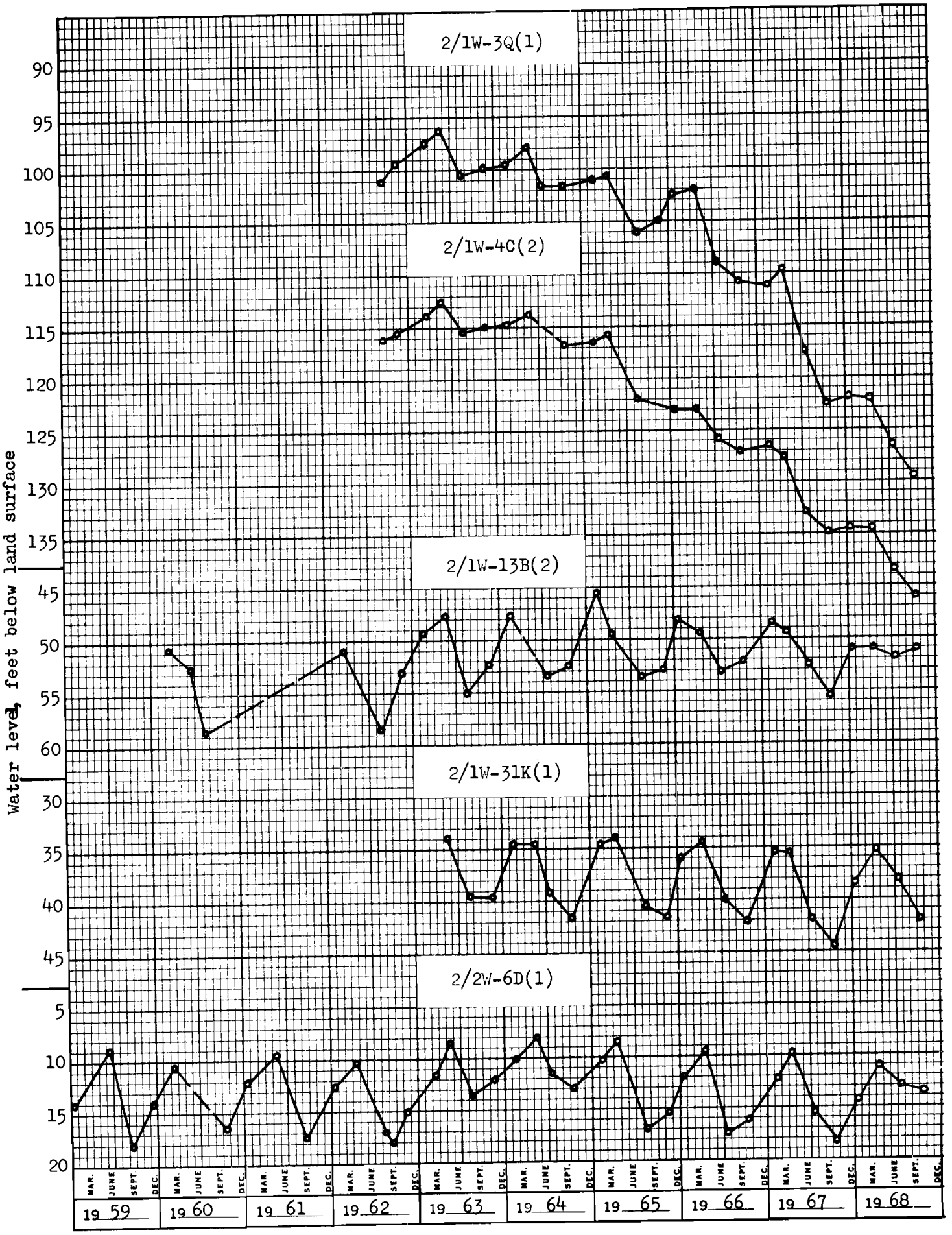
2/1W-4C(2) (Harris H. Hanson) is a 600-foot drilled well in basalt located about 2 miles west of Tigard.

2/1W-13B(2) (Ralph Sittel) is a 162-foot drilled well in sand and gravel located about 1½ miles NE of Tualatin.

2/1W-31K(1) (Charles Kennerly) is a 215-foot drilled well in basalt located about one mile SW of Sherwood.

2/2W-6D(1) (S. R. Rotchstrom) is a 486-foot well in basalt located about 6 miles south of Hillsboro. Periodic water level measurements available from 1951 to date.

TUALATIN VALLEY (1)



TUALATIN VALLEY (1)

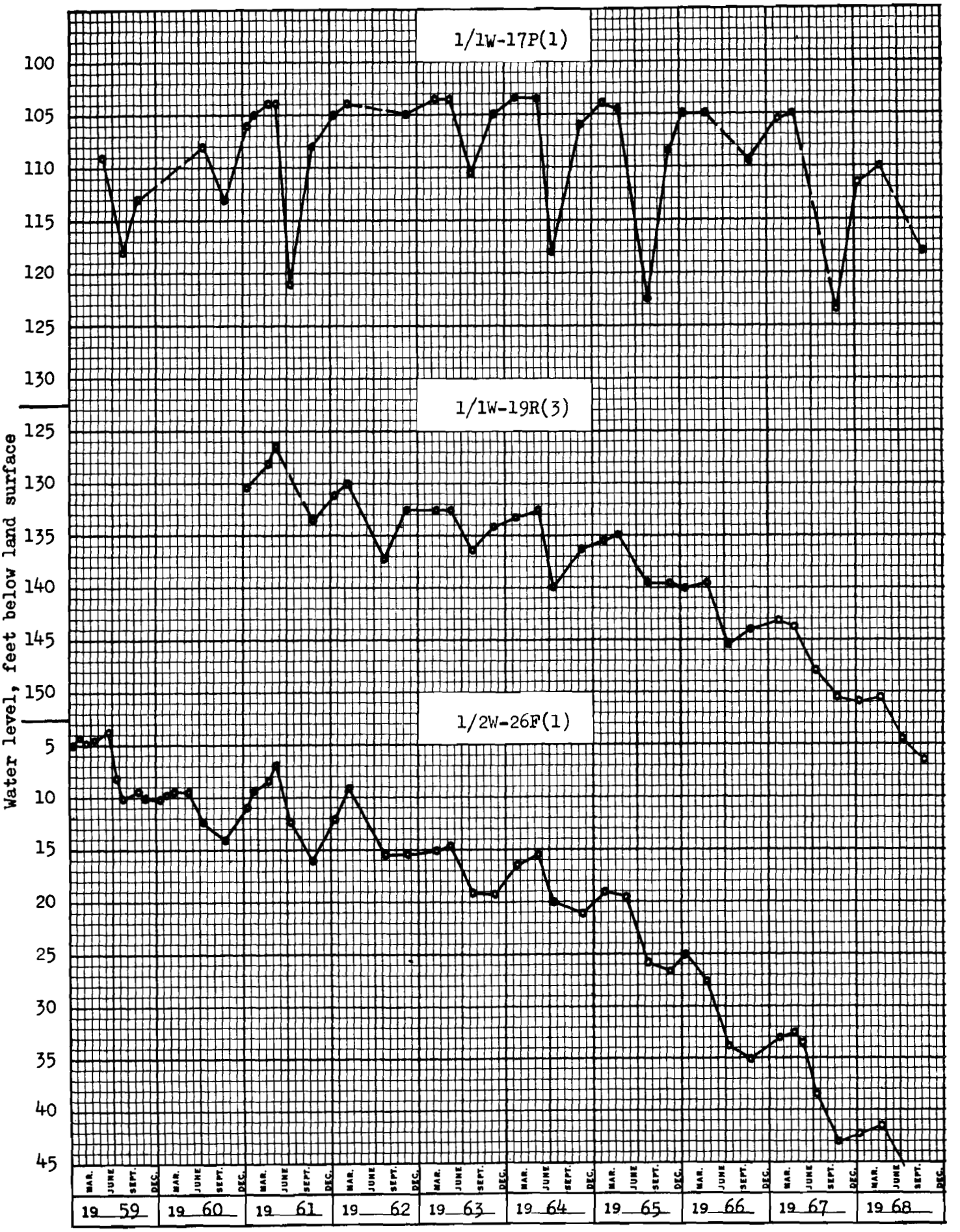
OBSERVATION WELLS

1/1W-17P(1) (Schuepbach Bros.) is a 414-foot drilled well in basalt located about 2 miles southwest of Beaverton.

1/1W-19R(3) (Earle L. Miller) is a 320-foot drilled well located about 4 miles southwest of Beaverton.

1/2W-26F(1) (Karl Schaefer) is a 403-foot drilled well in basalt located about 6 miles southwest of Beaverton. Periodic water level measurements available from 1958 to date.

TUALATIN VALLEY (1)



PORTLAND METROPOLITAN AREA (2)

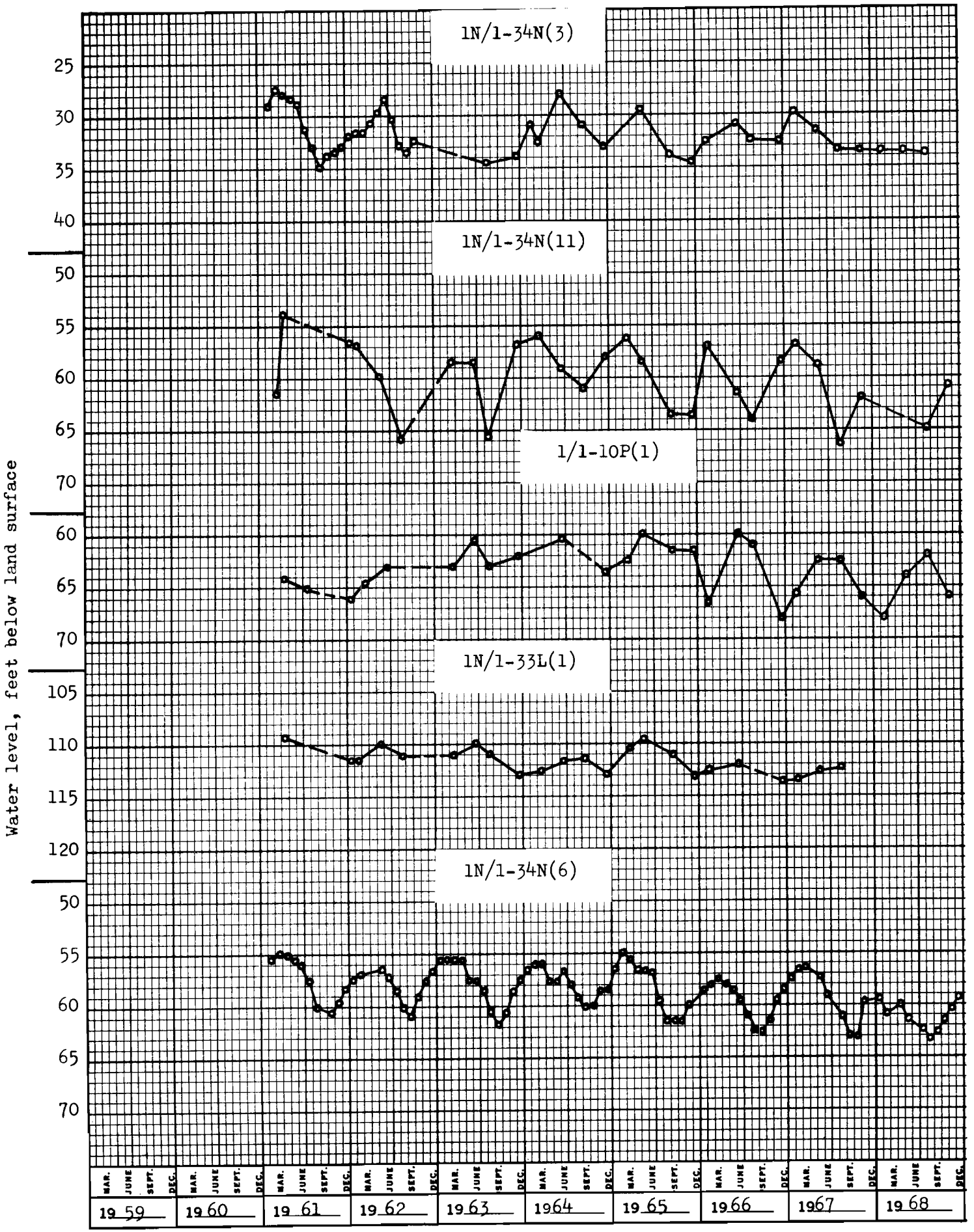
The westside business district of Portland is one of the most concentrated areas of large ground water developments in the Portland Metropolitan area. Ground water is used for heating and cooling of many of the large office buildings.

The westside business district is underlain by water-bearing alluvial sand and gravel deposits and the Columbia River basalt formation. The water-bearing gravels are separated from the underlying basalt by a section of silt and clay known as the Sandy River Mudstone. Wells develop water from both the gravels and basalt. Many operators have constructed recharge wells for the disposal of waste water to reduce the cost of discharging waste waters to the city sewers. Some operators pump water from the basalt and dispose of water in the gravels and other operators pump water from the gravels and dispose of water into the basalt. This seasonal transfer of water from one formation to another and the difference in water quality and water temperature has created a very complex hydrologic system.

OBSERVATION WELLS

1N/1-34N(3)	(Equitable Savings & Loan Association) is a 158-foot drilled well in gravel located in the Westside Business District.
1N/1-34N(11)	(Dirks Medical Center) is a 418-foot drilled well in basalt located in the Westside Business District.
1/1-10P(1)	(J. Donald Kroeker & Associates) is a 486-foot well in basalt located in Westside Portland near Ross Island.
1N/1-33L(1)	(Fred Meyer, Inc.) is a 195-foot drilled well in gravel located in the Westside Business District.
1N/1-34N(6)	(Pittock Block, Inc.) is a 96.6-foot drilled well in gravel located in the Westside Business District.
1/1-3D(3)	(Pacific Power & Light Company - Public Service Building) Measurements discontinued as well has been abandoned. Periodic water level measurements available from 1961 to 1967.

PORTLAND METROPOLITAN AREA (2)



OBSERVATION WELLS

1N/1-34N(1) (Weisfield's Incorporated) is a 155-foot drilled well in gravel located in the Westside Business District. Periodic water level measurements available from 1940 to date.

1N/1-33C(2) (Good Samaritan Hospital) is a 400-foot drilled well in basalt located in the Westside Business District.

1N/1-34N(14) (First National Bank of Portland) is a 544-foot drilled well in basalt located in the Westside Business District.

1N/1-34N(12) (Federal Reserve Bank) Measurements discontinued due to continuous pumpage. Water level measurements available from 1961 to 1967.

REFERENCES

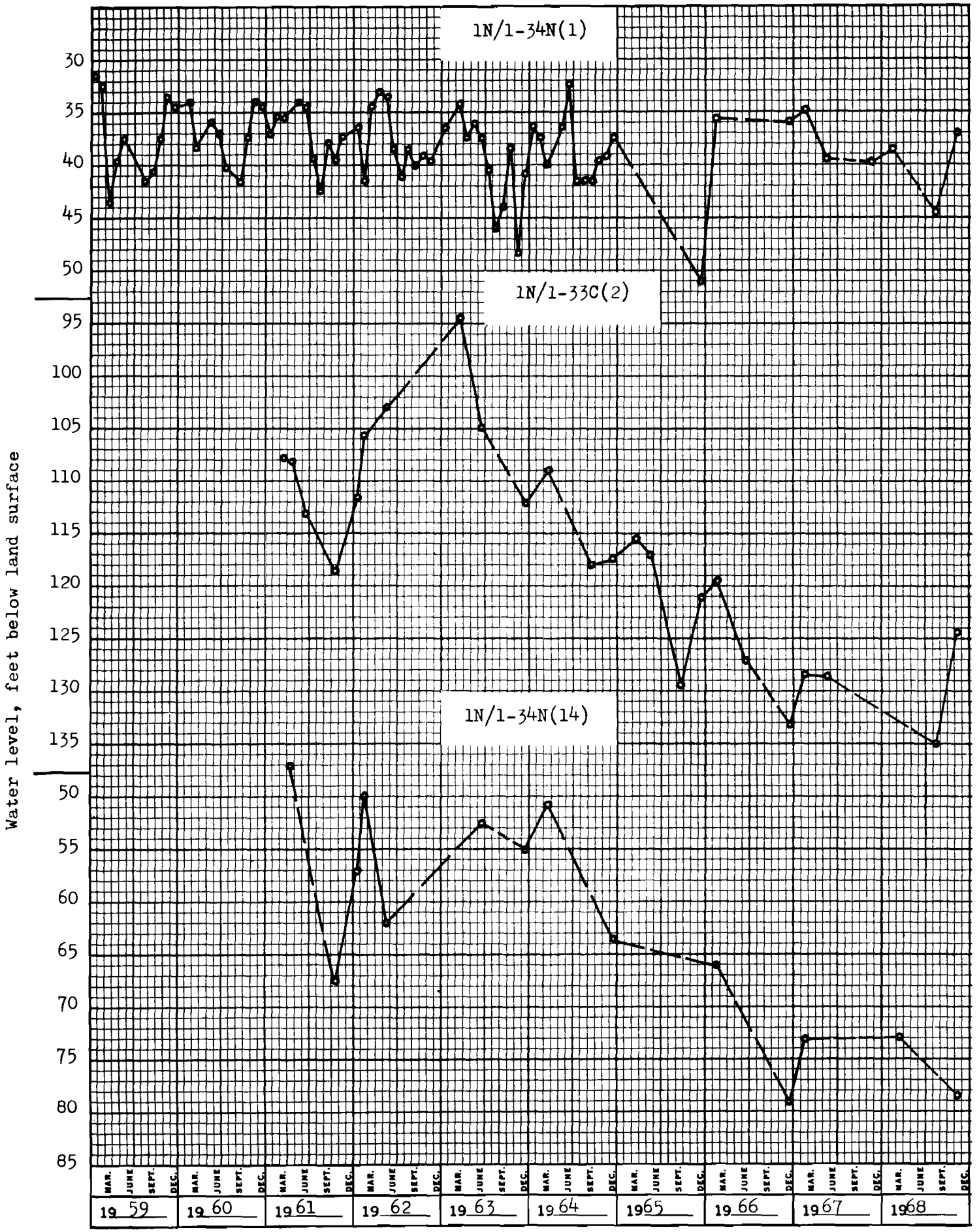
Brown, S. G., 1963, Problems of utilizing ground water in the Westside Business District of Portland, Oregon: U. S. Geological Survey Water Supply Paper 1619-).

Foxworthy, B. L., Hogenson, G. M., and Hampton, E. R., 1964, Records of wells and springs, water levels and chemical quality of ground water in the East Portland Area, Oregon: State Engineer Ground Water Report No. 3.

Griffin, W. C., et. al., 1956, Water resources of the Portland, Oregon and Vancouver, Wasington Area: U. S. Geological Survey Circular 372.

Hogenson, G. M., and Foxworthy, B. L., 1965, Ground water in the East Portland Area, Oregon: U. S. Geological Survey Water Supply Paper 1793.

PORTLAND METROPOLITAN AREA (2)



PORTLAND METROPOLITAN AREA (2)

No problems of overdevelopment of the ground-water supply are known in the East Portland area. The permeable character of the alluvial deposits provide productive ground-water reservoirs. The extensive development of the East Portland area has created a pollution threat as some of the shallow ground-water supplies in parts of the area can be readily polluted by the surface and near-surface disposal of waste.

OBSERVATION WELLS

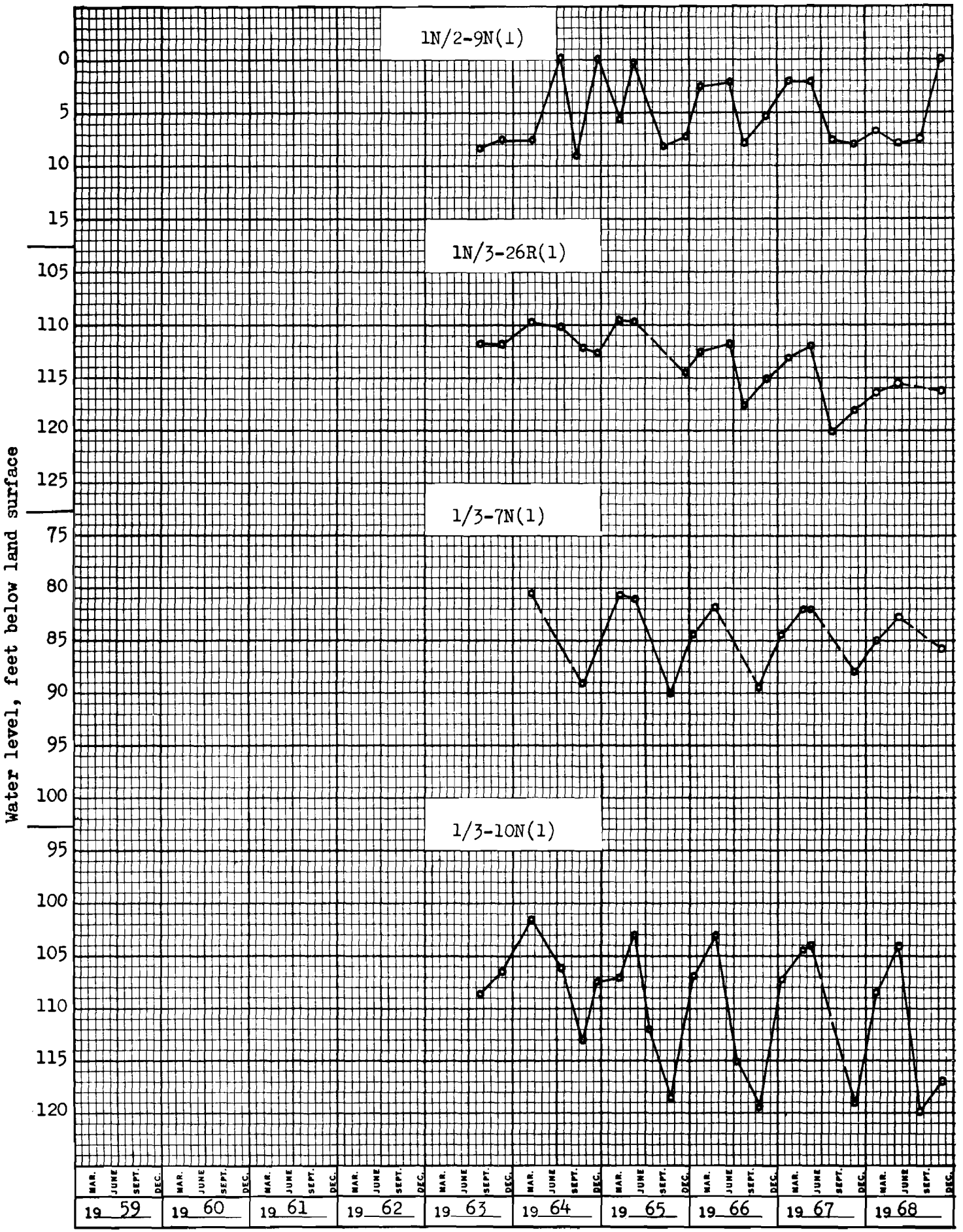
1N/2-9N(1) (Port of Portland) is a 155-foot drilled well in sand and gravel located about one mile north of Parkrose.

1N/3-26R(1) (Kazuo Fujii) is a 478-foot drilled well in gravel located about one mile SW of Troutdale.

1/3-7N(1) (Meadowland Dairy) is a 261-foot drilled well in sand and gravel located about 2 miles SW of Gresham.

1/3-10N(1) (Forest Lawn Memorial Park) is a 715-foot drilled well in gravel located in Gresham.

PORTLAND METROPOLITAN AREA (2)



THE DALLES AREA (3)

The area in and around Dalles City has been declared a "Critical Ground Water Area" because of declining water levels. The ground-water reservoir developed by most of the municipal, industrial and irrigation wells develop ground water from a very permeable zone in the Columbia River Basalt Formation. This zone has been named The Dalles Ground Water Reservoir and is locally known as "The Dalles Pool". The 1966 spring high position of the water level in The Dalles Ground Water Reservoir was at an altitude of about 39 feet, or some 34 feet below the adjacent level of the Bonneville pool in the Columbia River, which was about the same as the 1965 spring high position. A reduction of ground-water withdrawals occurred during 1965 and 1966 because of the initial operation of The Dalles Irrigation Project. Water levels in The Dalles Ground Water Reservoir continued to decline however, and a new all time low level occurred in September, 1966. The rate of water level decline during 1966 is less than previous years.

OBSERVATION WELLS

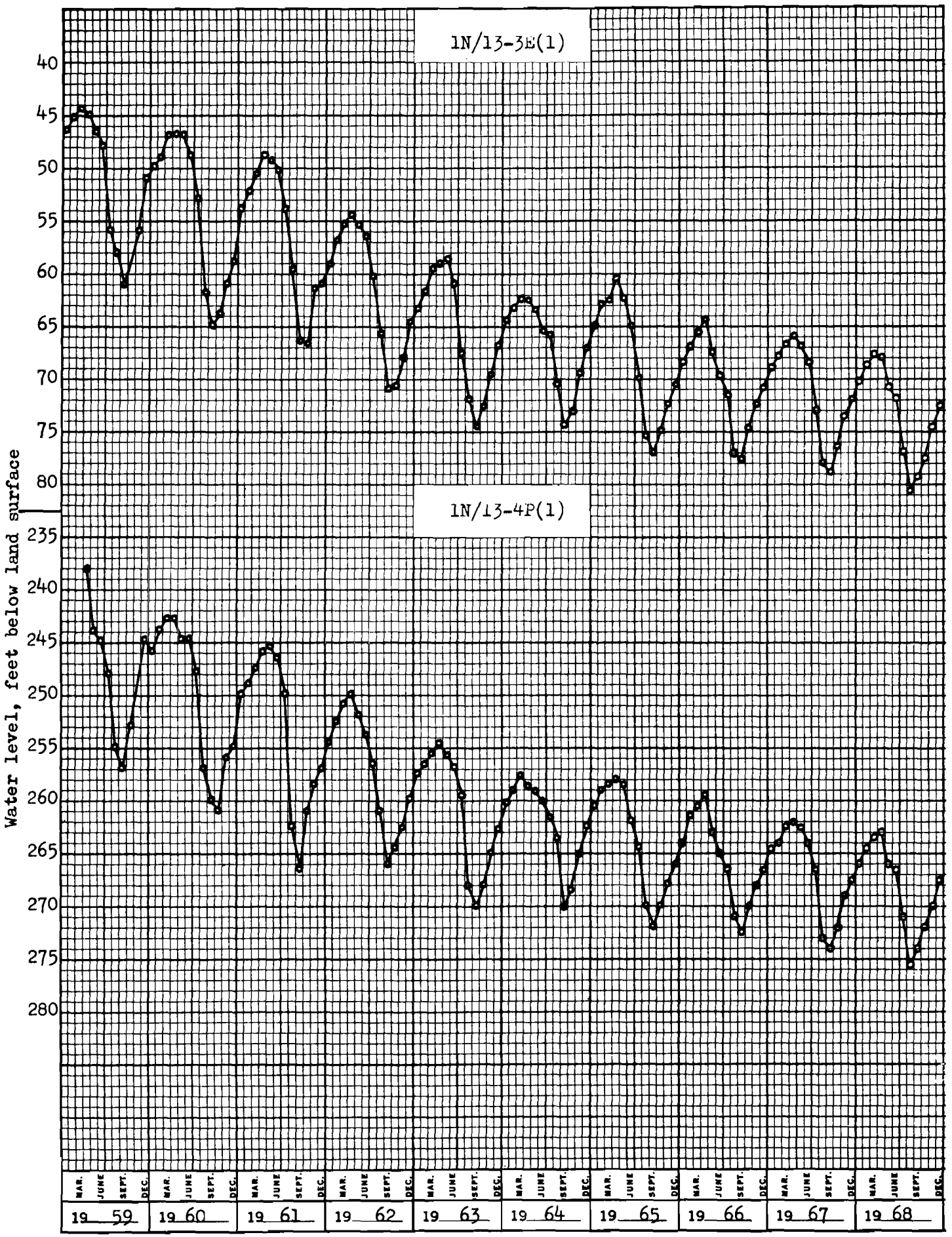
1N/13-3E(1) (Dalles City - City Hall Well) is a 200.5-foot drilled well in basalt located in The Dalles. Periodic water level measurements available from 1926-1930; 1951-1952 and 1958 to date.

1N/13-4P(1) (Dalles City - Marx Well) is a 570-foot drilled well in basalt located in The Dalles.

REFERENCES

Piper, A. M., 1932, Geology and ground water resources of The Dalles Region, Oregon: U. S. Geological Survey Water Supply Paper 659-B.

THE DALLES AREA (3)



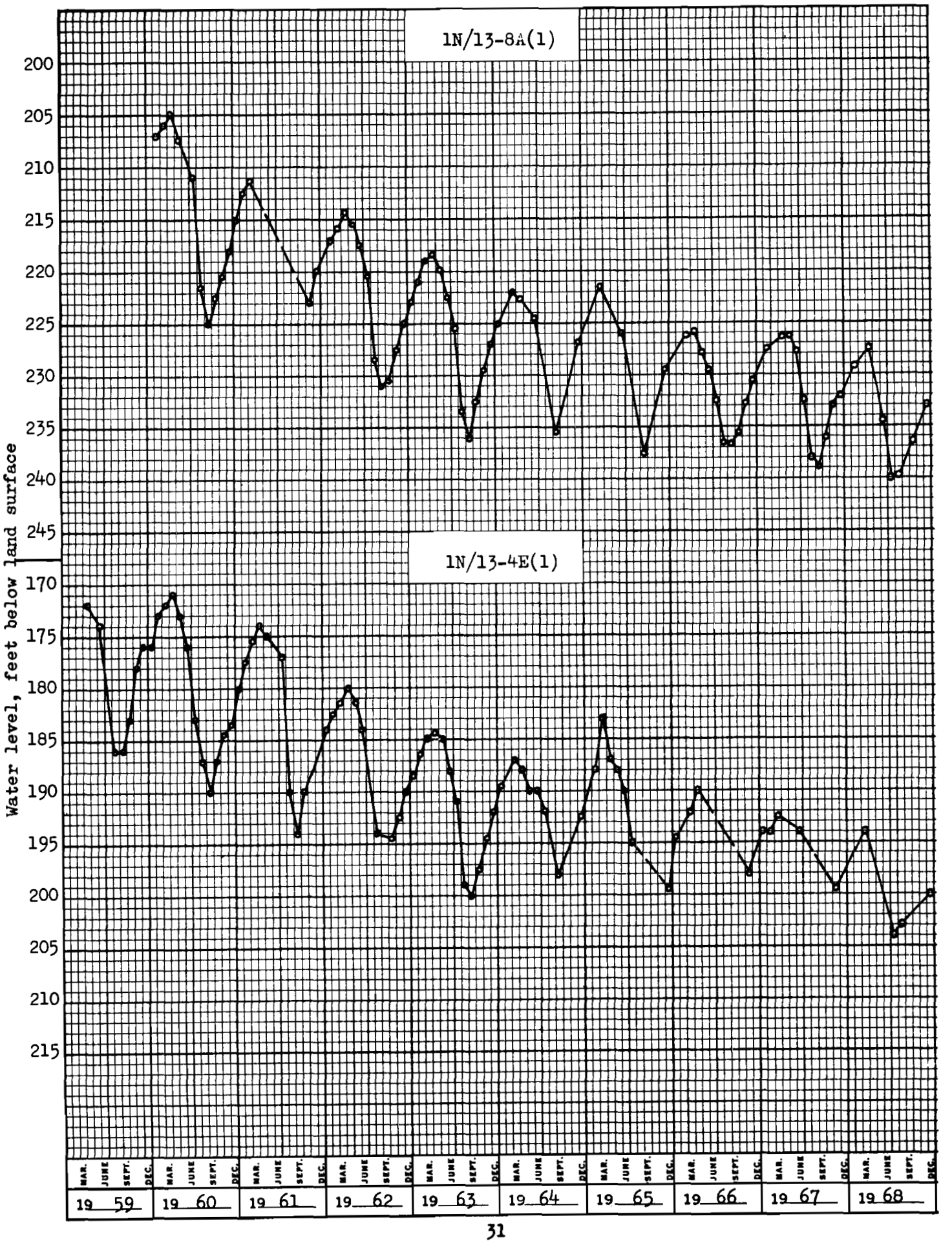
THE DALLES AREA (3)

OBSERVATION WELLS

1N/13-8A(1) (G. S. Williams) is a 341-foot drilled well in basalt located about one mile south of The Dalles.

1N/13-4E(1) (Odd Fellows Cemetery) is a 306-foot drilled well in basalt located about one mile west of The Dalles. Periodic water level measurements available from 1956 to date.

THE DALLES AREA (3)



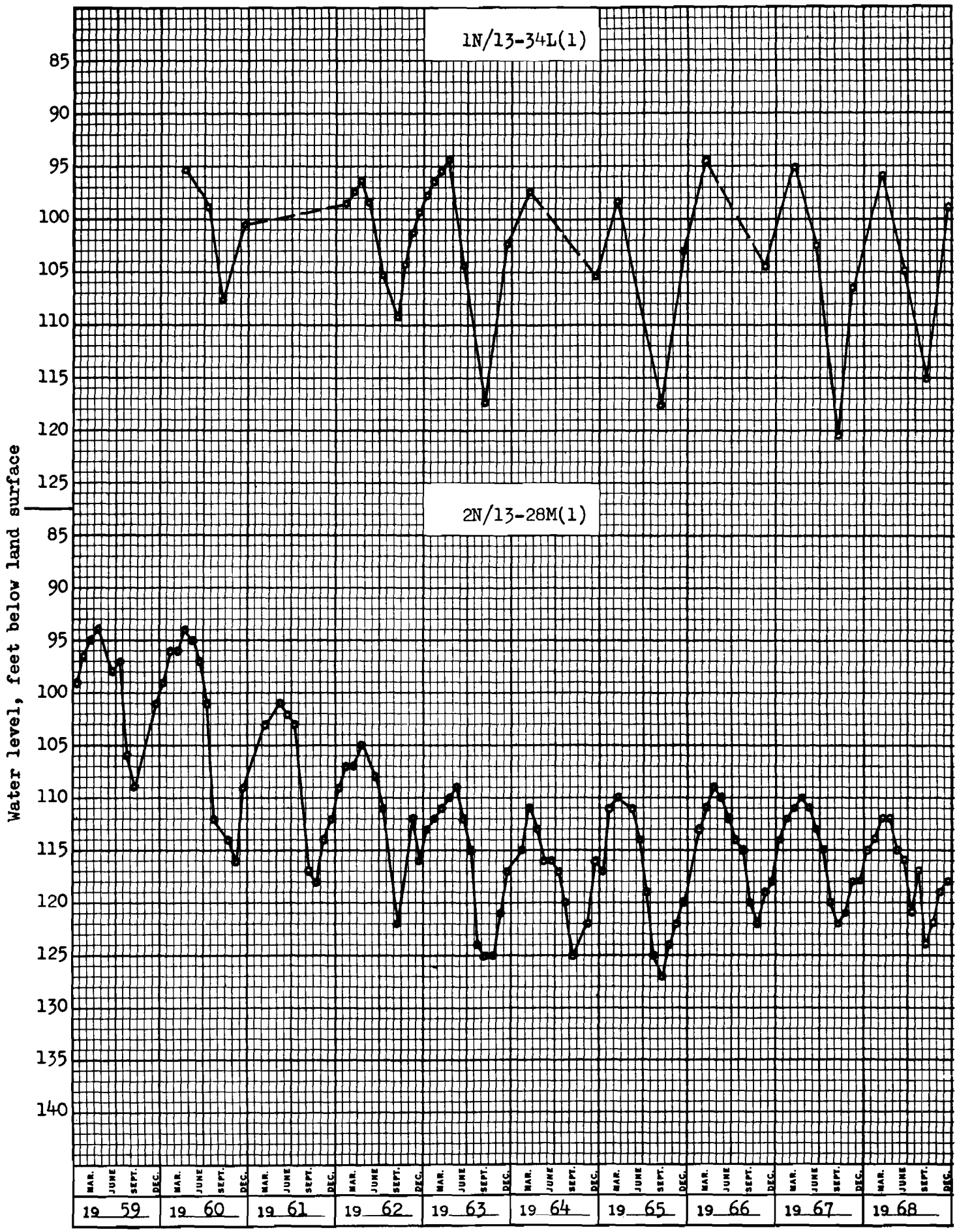
THE DALLES AREA (3)

OBSERVATION WELLS

1N/13-34L(1) (George F. Bradley, formerly Westgage) is a 500-foot drilled well in basalt located about 6 miles south of The Dalles in the Fivemile Creek Valley.

2N/13-28M(1) (Harvey Aluminum Company) is a 314-foot drilled well in basalt located about 2 miles NW of The Dalles. Periodic water level measurements available from 1957 to date.

THE DALLES AREA(3)



THE DALLES AREA (3)

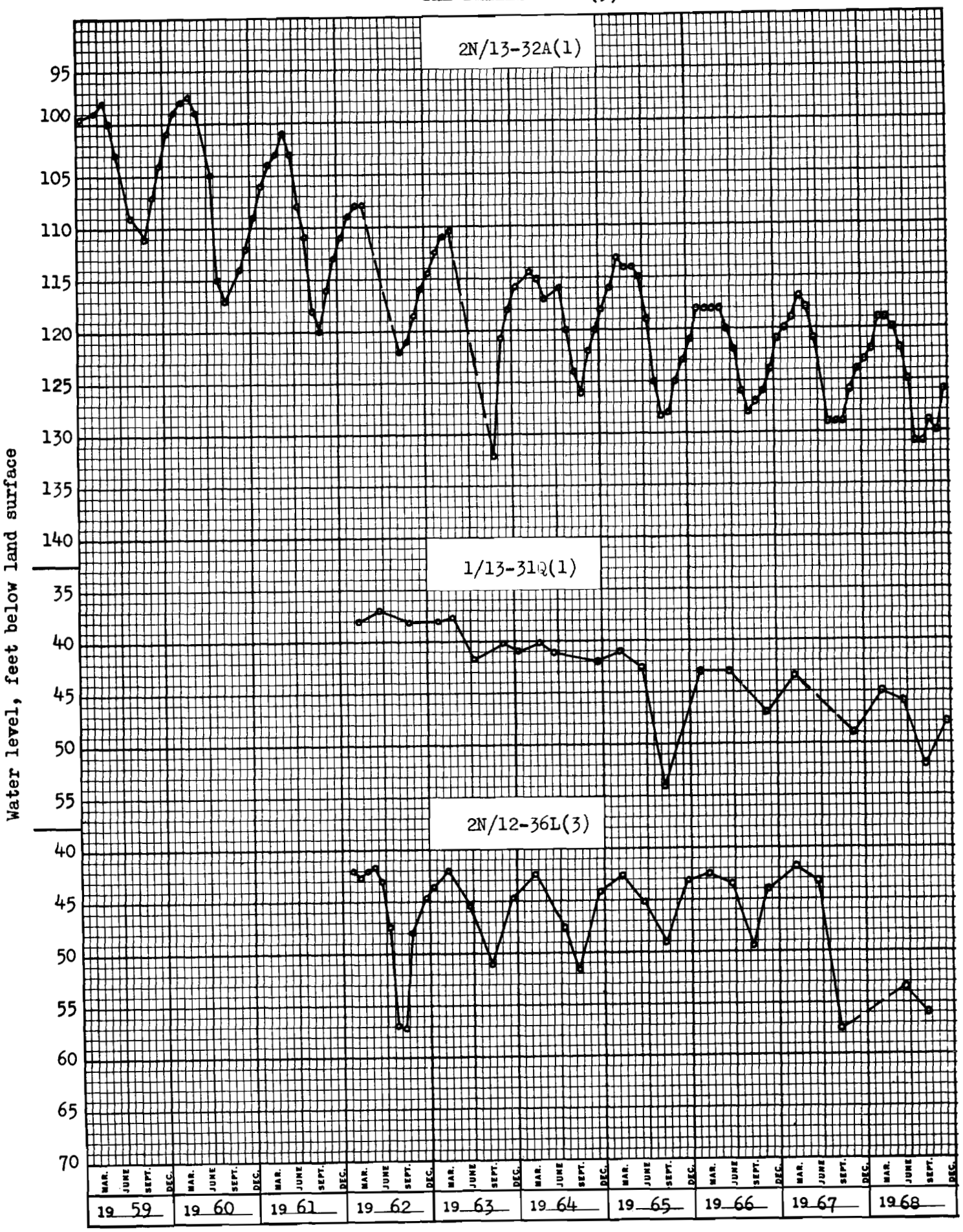
OBSERVATION WELLS

2N/13-32A(1) (Chenowith Irrigation Coop.) is a 275-foot drilled well in basalt located about one mile NW of The Dalles. Periodic water level measurements available from 1957 to date.

1/13-31Q(1) (William L. Hulse) is a 111-foot drilled well in basalt located about 5 miles SW of Dufur.

2N/12-36L(3) (W. S. Nelson) is a 320-foot drilled well in sandstone located about 5 miles west of The Dalles.

THE DALLES AREA (3)



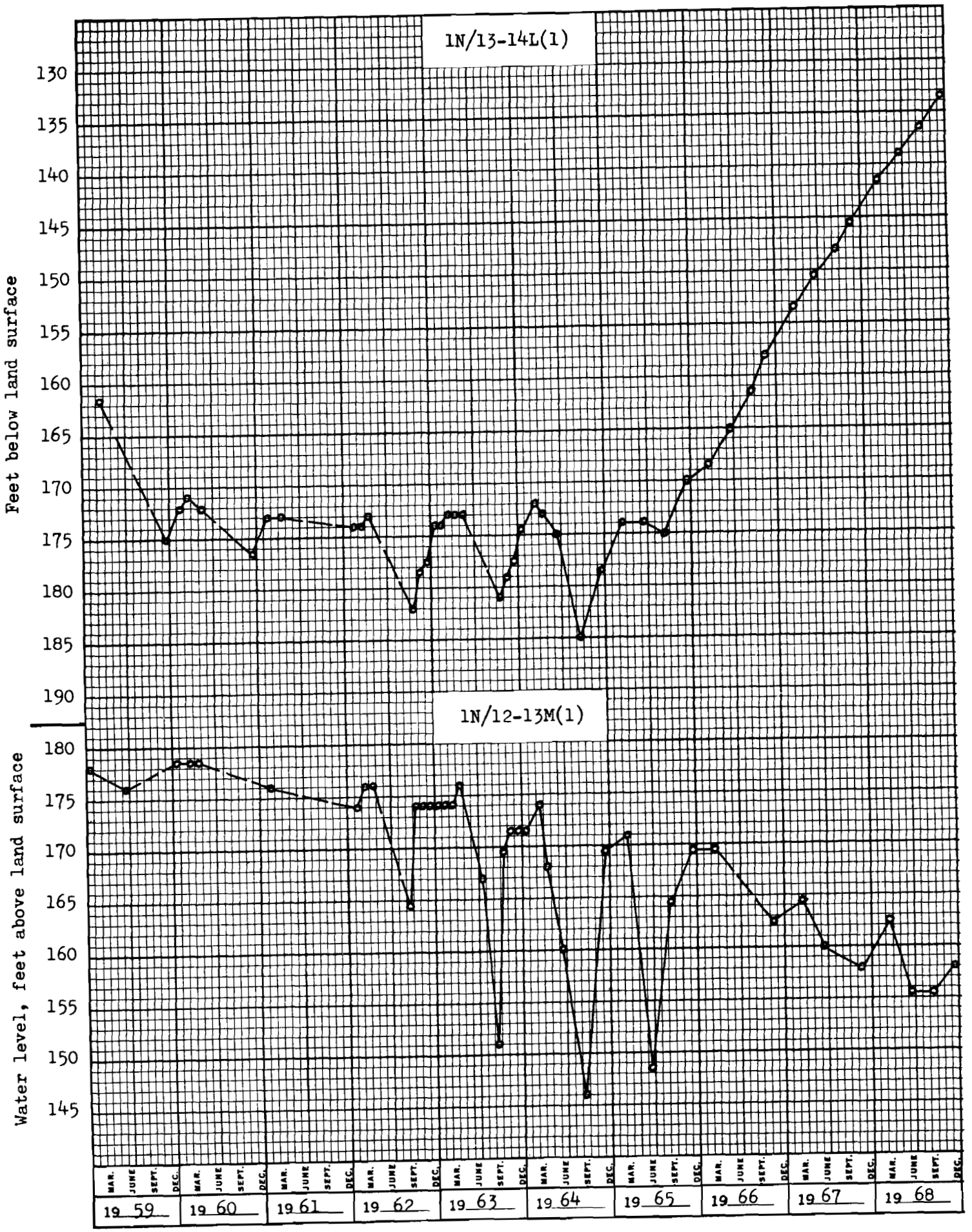
THE DALLES AREA (3)

OBSERVATION WELLS

1N/13-14L(1) (V. R. Martin) is a 230-foot drilled well in basalt located about 2 miles south of The Dalles in the Threemile Creek Valley.

1N/12-13M(1) (Julius Sandoz) is a 572-foot drilled well in basalt located about 4 miles SW of The Dalles in the Mill Creek Valley. Periodic water level measurements available from 1957 to date.

THE DALLES AREA (3)



COLUMBIA SLOPE AREA (4)

The Columbia Slope area includes the broad northward sloping area in northwestern Umatilla County and northern Morrow County. A large part of this area is underlain by 100 feet or more of sand and gravel and clay deposits that were laid down during the Ice Age. These deposits rest upon a very thick sequence of basaltic lava flows that have been named the Columbia River Basalt Formation. This formation is a series of individual lava flows layered one upon another. Individual flows may range from a few feet to a hundred feet or more in thickness. These very fluid lava flows welled to the surface from large cracks that opened up in many parts of the Columbia Basin area, and the lavas spread out as extensive lakes of molten rock. Long periods of time often separated the outpourings of lava. At times, soil zones and forests developed only to be buried by a subsequent lava flow. Tree casts and petrified wood occur in some locations along the Columbia River Highway in this formation. (Continued on Page 40)

OBSERVATION WELLS

3N/26-4L(1) (Luther Cramer) is a 623-foot drilled well in basalt located about 8 miles SW of Ordnance.

4N/27-32J(1) (R. Holzapfel) is a 310-foot drilled well in basalt located about 2 miles SW of Ordnance.

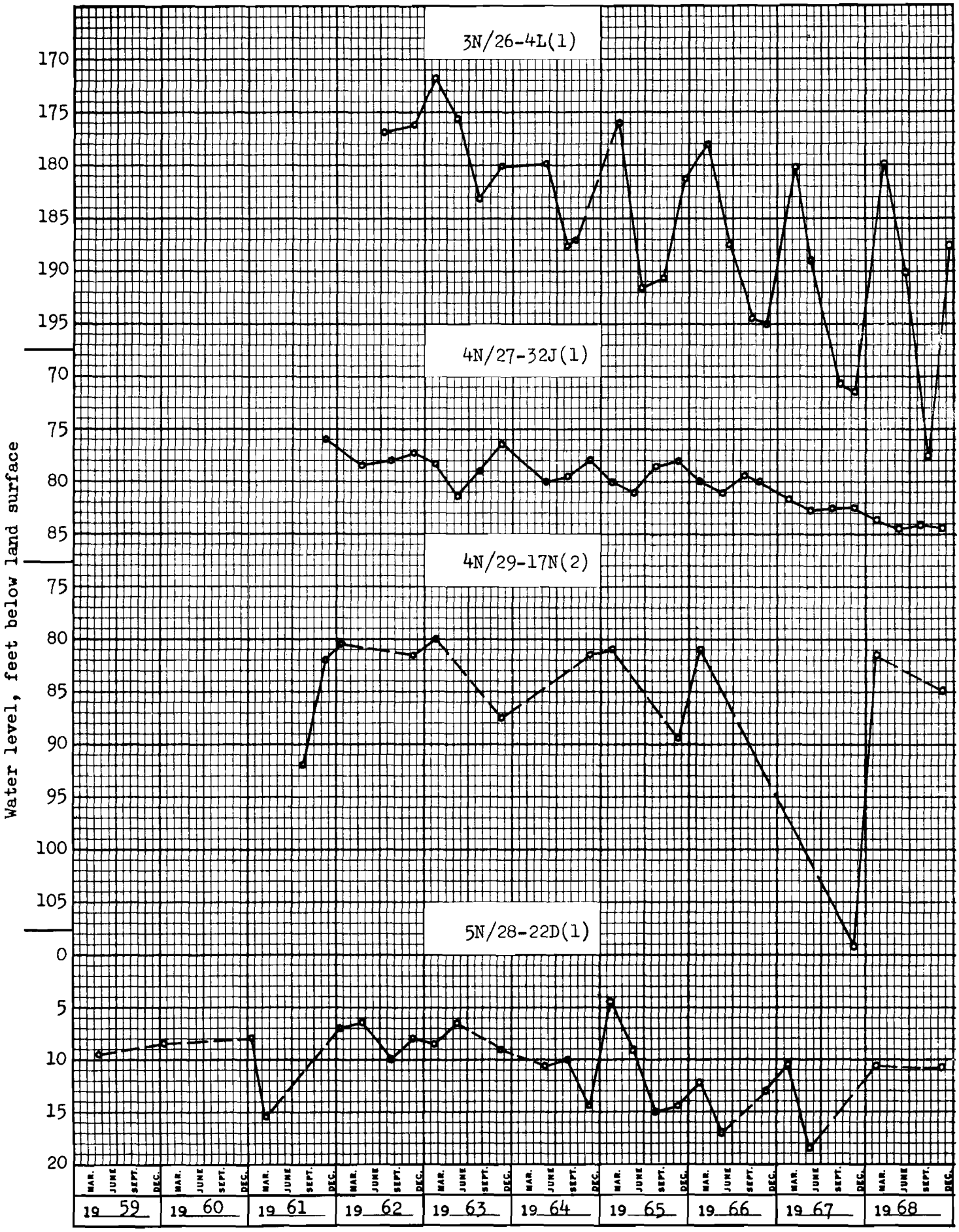
4N/29-17N(2) (Milton Culp) is a 207-foot drilled well in sand located about one mile north of Stanfield.

5N/28-22D(1) (L. J. Martin, formerly Munson) is a 189-foot drilled well in basalt located about 3 miles south of Umatilla. Periodic water level measurements available from 1953 to date.

REFERENCES

Hogenson, G. M., 1964, Geology and ground water of the Umatilla River Basin, Oregon: U. S. Geological Survey Water Supply Paper 1620.

COLUMBIA SLOPE AREA (4)



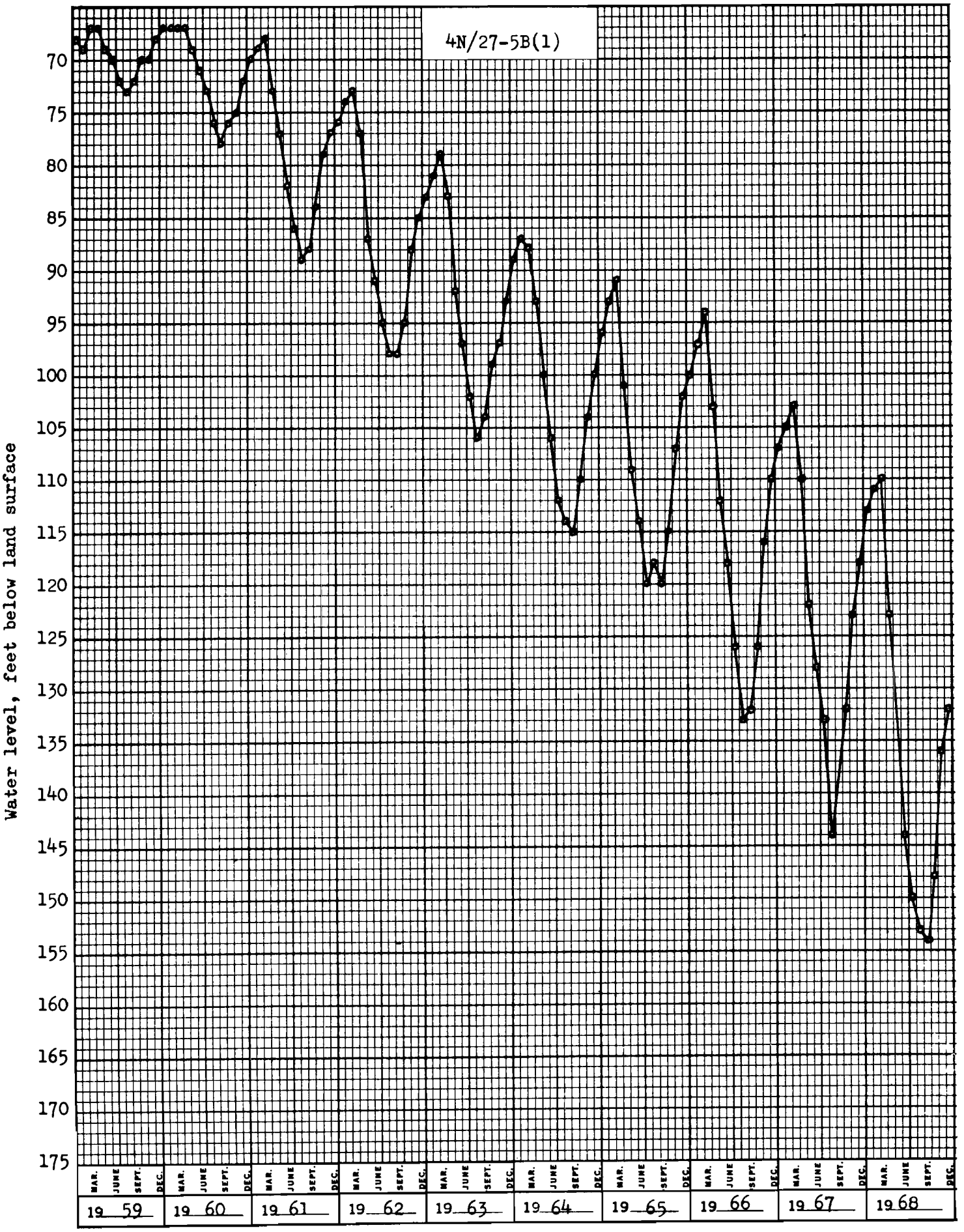
COLUMBIA SLOPE AREA (4)

Most of the Columbia River Basalt Formation has low porosity, that is, the per cent of open space for the storage of water is low, probably averaging less than one per cent. Part of this porosity is formed by shrinkage cracks that formed when the lava consolidated, part is formed by the bubble holes that develop near the surface of individual lava flows by expanding gases in the zone of reduced pressure. These inflated and rubbly, broken zones form the contacts between lava flows. The shrinkage cracks and bubble holes are generally interconnected to a degree that allows for the easy passage of water. The contact zones between flows are at places very permeable and serve as the chief zones for the development of ground water. Generally several such permeable zones must be penetrated by wells in order to develop an adequate water supply for the larger capacity wells. (Continued on Page 42)

OBSERVATION WELLS

4N/27-5B(1) (Umatilla Army Depot - Well No. 6) is a 710-foot drilled well in basalt located at Ordnance. Periodic water level measurements available from 1955 to date.

COLUMBIA SLOPE AREA (4)



COLUMBIA SLOPE AREA (4)

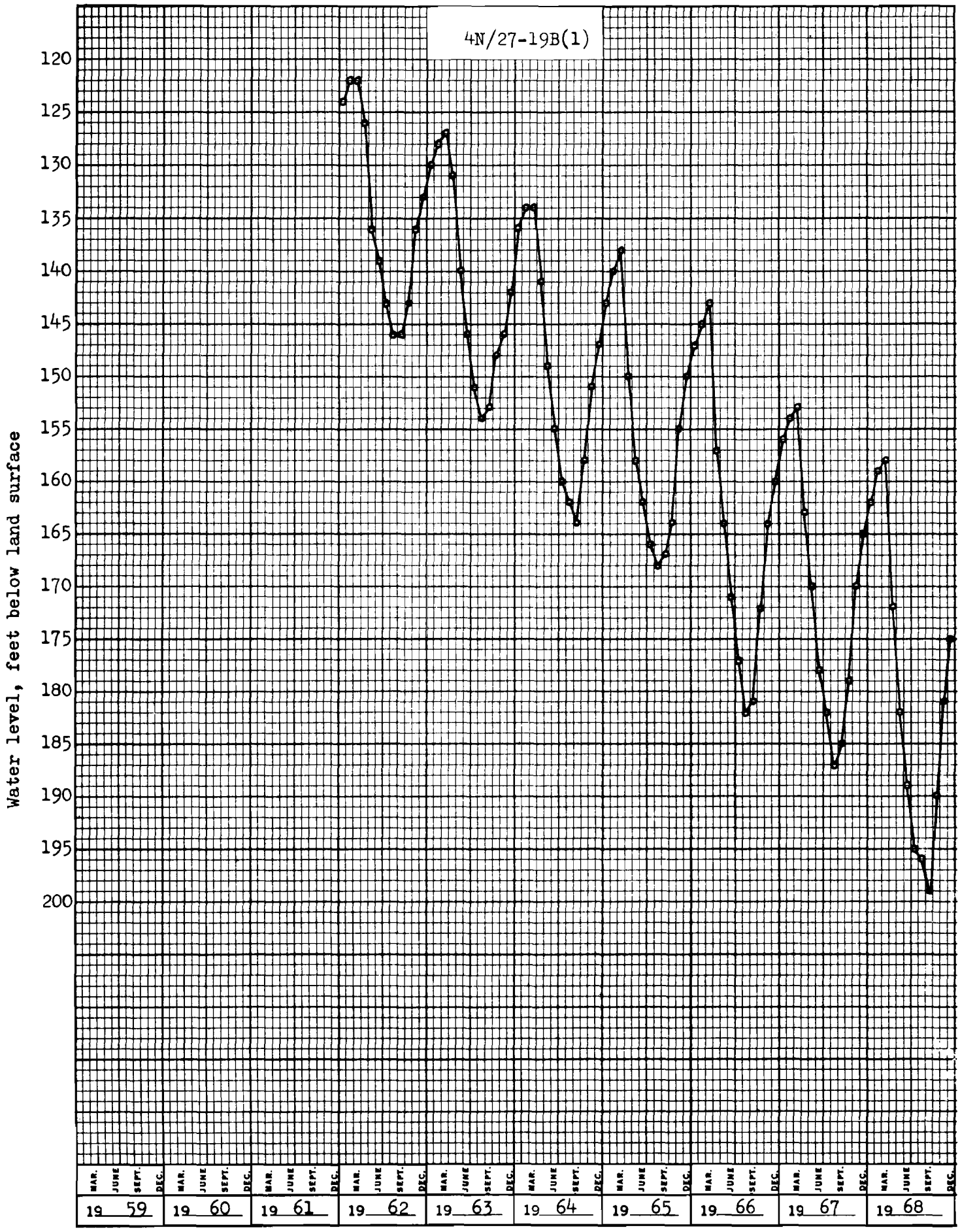
Ground water occurring in the gravels overlying the basalt is recharged chiefly by irrigation water imported into the area. The shallow water-bearing zones in the underlying basalt formation are believed to be hydraulically connected with the overlying gravels and the two constitute one ground water reservoir. No serious problems of water level decline have yet developed in the gravel formation. From the available data, it appears that water levels are higher and more ground water is available in the gravel formation in the months of August and September than in the months of May and June. This is believed due to the recharge of imported irrigation water from the Umatilla River.

The deep water-bearing zones in the basalt are hydraulically separated from the shallow water-bearing zone and receive very little annual recharge. The meager amount of pumping from these deep zones in the past few years has been sufficient to cause a major decline in water levels and it appears that we are mining the available ground water supply from these deep zones. This occurs whenever annual pumping exceeds the rate of annual recharge.

OBSERVATION WELLS

4N/27-19B(1) (Umatilla Army Depot - Well No. 4) is a 600- foot drilled well in basalt located at Ordnance. Periodic water level measurements available from 1955 to date.

COLUMBIA SLOPE AREA (4)



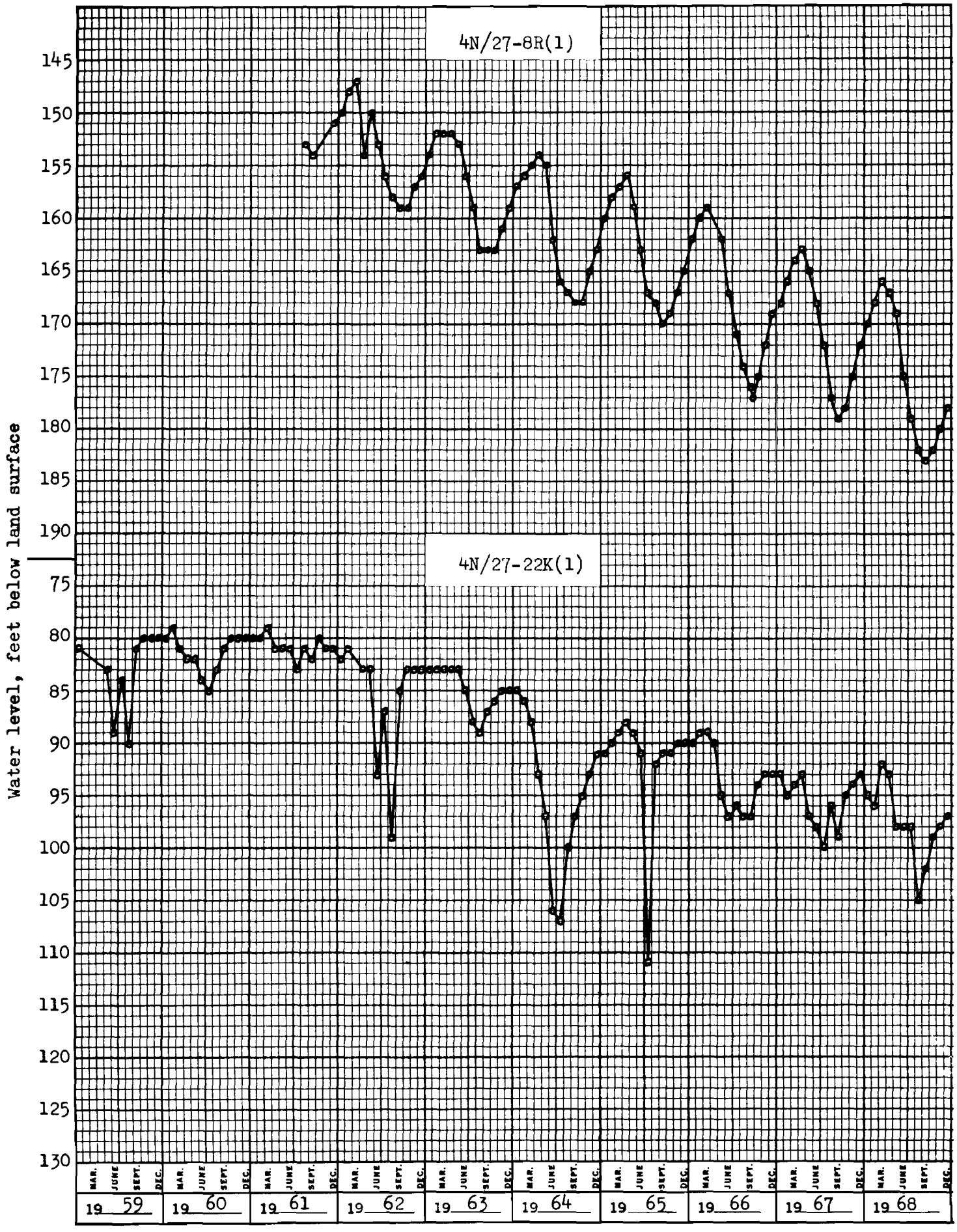
COLUMBIA SLOPE AREA (4)

OBSERVATION WELLS

4N/27-8R(1) (Umatilla Army Depot - Well No. 3) is a 453-foot drilled well in basalt located at Ordnance. Periodic water level measurements available from 1950-1951 and from 1961 to date.

4N/27-22K(1) (Umatilla Army Depot - Well No. 2) is a 360-foot drilled well in basalt located at Ordnance. Periodic water level measurements available from 1950-1951 and from 1954 to date.

COLUMBIA SLOPE AREA (4)



MILTON-FREEWATER AREA (5)

Milton-Freewater is located at the head of a large alluvial fan where the Walla Walla River flows out of the Blue Mountains. The fan, is composed of coarse alluvium and is recharged by the Walla Walla River and irrigation diversions. High ground water levels in many of the wells occurs during the irrigation season. The permeable character of the alluvial gravels and the extensive recharge from irrigation creates a pollution threat to all shallow wells on the alluvial fan.

The alluvial fan is underlain at depth by the Columbia River Basalt Formation. Some of the deep wells in the Milton-Freewater area, which develop ground water from the basalt, have been declining in recent years.

OBSERVATION WELLS

5N/35-1C(1) (William A. Bingman) is a 32.5-foot dug well in gravel located near Milton-Freewater. Periodic water level measurements available from 1933 to date.

5N/35-2C(1) (K. A. Townsend) is a 22-foot dug well in sand & gravel located about one mile west of Milton-Freewater. Periodic water level measurements available from 1933 to date.

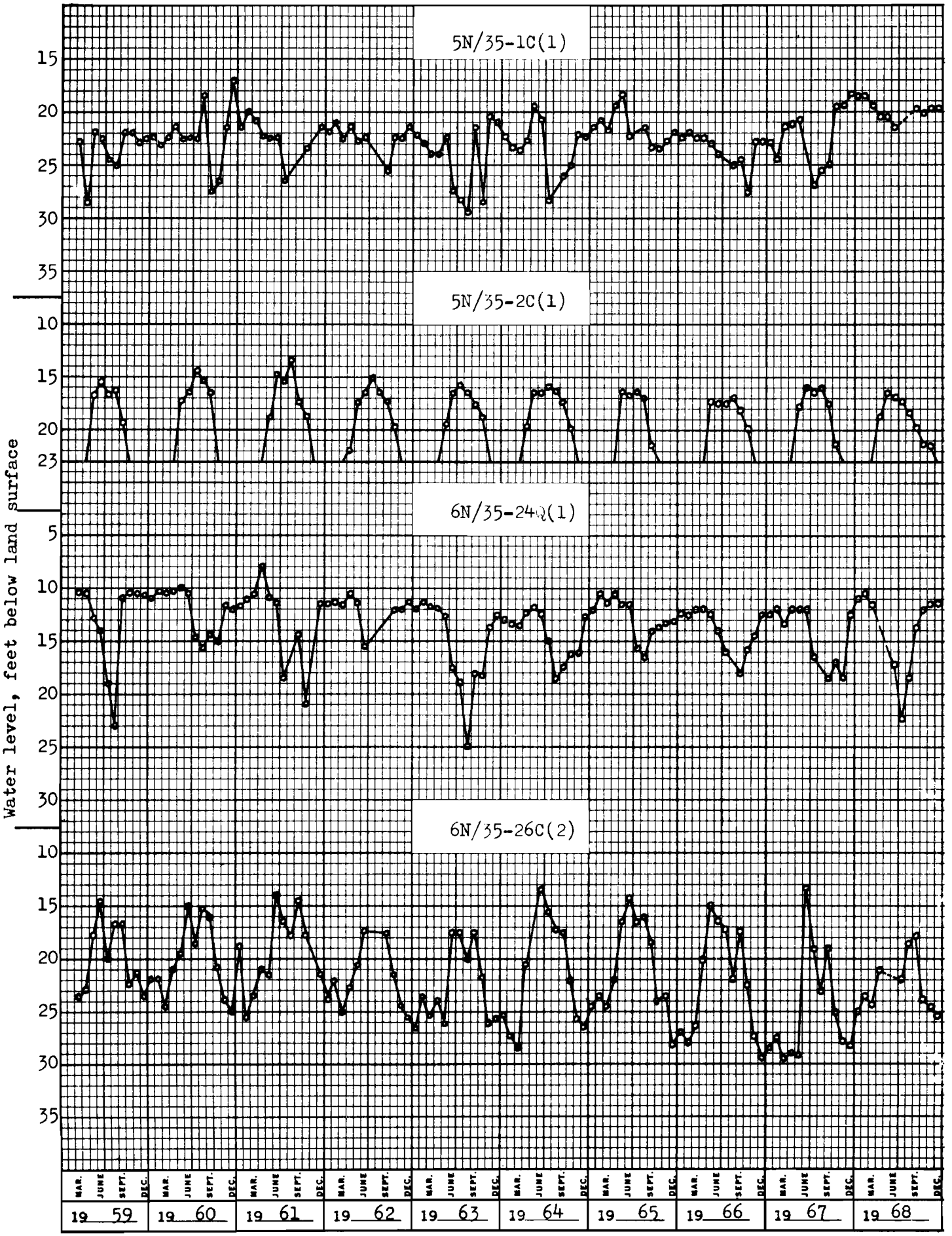
6N/35-24Q(1) (George H. Ransom) is a 165-foot dug & drilled well in gravel located about 3 miles north of Milton-Freewater. Periodic water level measurements available from 1933 to date.

6N/35-26C(2) (Earl Ransom) is a 110-foot dug & drilled well in gravel located about 2 miles north of Milton-Freewater. Periodic water level measurements available from 1933 to date.

REFERENCES

Newcomb, R. C., 1951, Preliminary report on the ground water resources of the Walla Walla Basin, Washington-Oregon: U. S. Geological Survey open-file report.

MILTON-FREEWATER AREA (5)



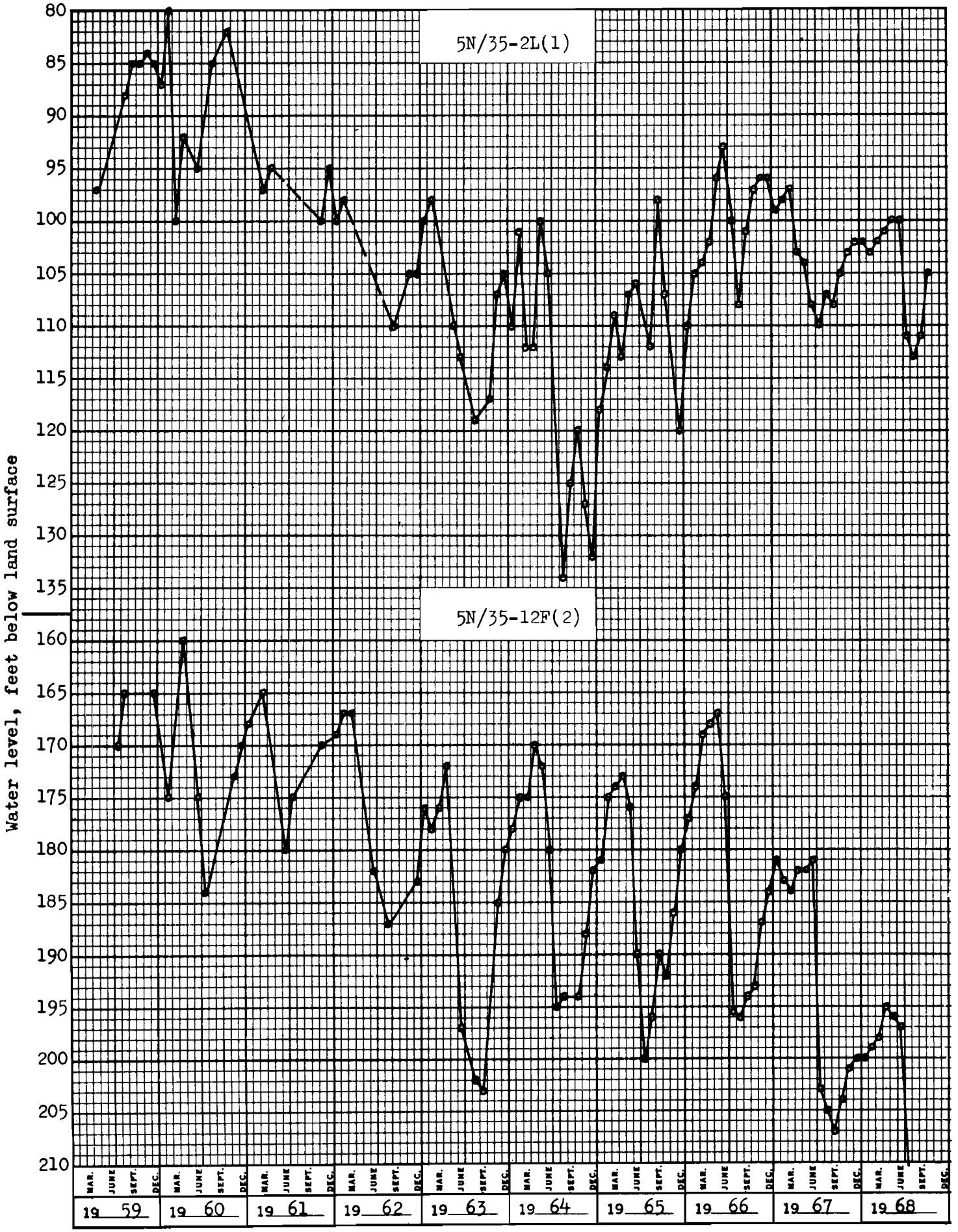
MILTON-FREEWATER AREA (5)

OBSERVATION WELLS

5N/35-2L(1) (City of Milton-Freewater - Well No. 6) is a 952-foot drilled well in Columbia River Basalt located within the city of Milton-Freewater. Periodic water level measurements available from 1954 to date.

5N/35-12F(2) (City of Milton-Freewater - Well No. 2) is a 902-foot drilled well in Columbia River Basalt located within the city of Milton-Freewater. Periodic water level measurements available from 1954 to date.

MILTON-FREEWATER (5)



PENDLETON-PILOT ROCK AREA (6)

The Pendleton-Pilot Rock area lies in a structural valley formed in the Columbia River Basalt Formation. This structural valley has been partially filled with sand and gravel deposits. The deep wells all develop water from the basalt formation. Some water level declines have been reported in the Weston area.

The uncertainty of being able to develop large ground-water supplies in the Columbia River at every location was demonstrated in 1965 by the construction of a 1,500-foot well at Pendleton which had a capacity of only 525 gallons per minute with 361 feet of drawdown. A new well at Pilot Rock encounted artesian conditions at a depth of 880 feet. Work continues in attempting to control leakage zones in this well.

OBSERVATION WELLS

2N/32-2N(1) (City of Pendleton - Stillman Park Well) is a 700-foot drilled well in Columbia River Basalt located within the city of Pendleton.

1/32-17G(1) (City of Pilot Rock - Well No. 1) is a 309-foot artesian well drilled in Columbia River Basalt located within the city of Pilot Rock.

1/32-17K(1) (City of Pilot Rock - Well No. 2) is a 486-foot artesian well drilled in Columbia River Basalt located within the city of Pilot Rock.

1/32-23J(1) (Hilmer Horn) is a 774-foot drilled well in basalt located about 4 miles SE of Pilot Rock.

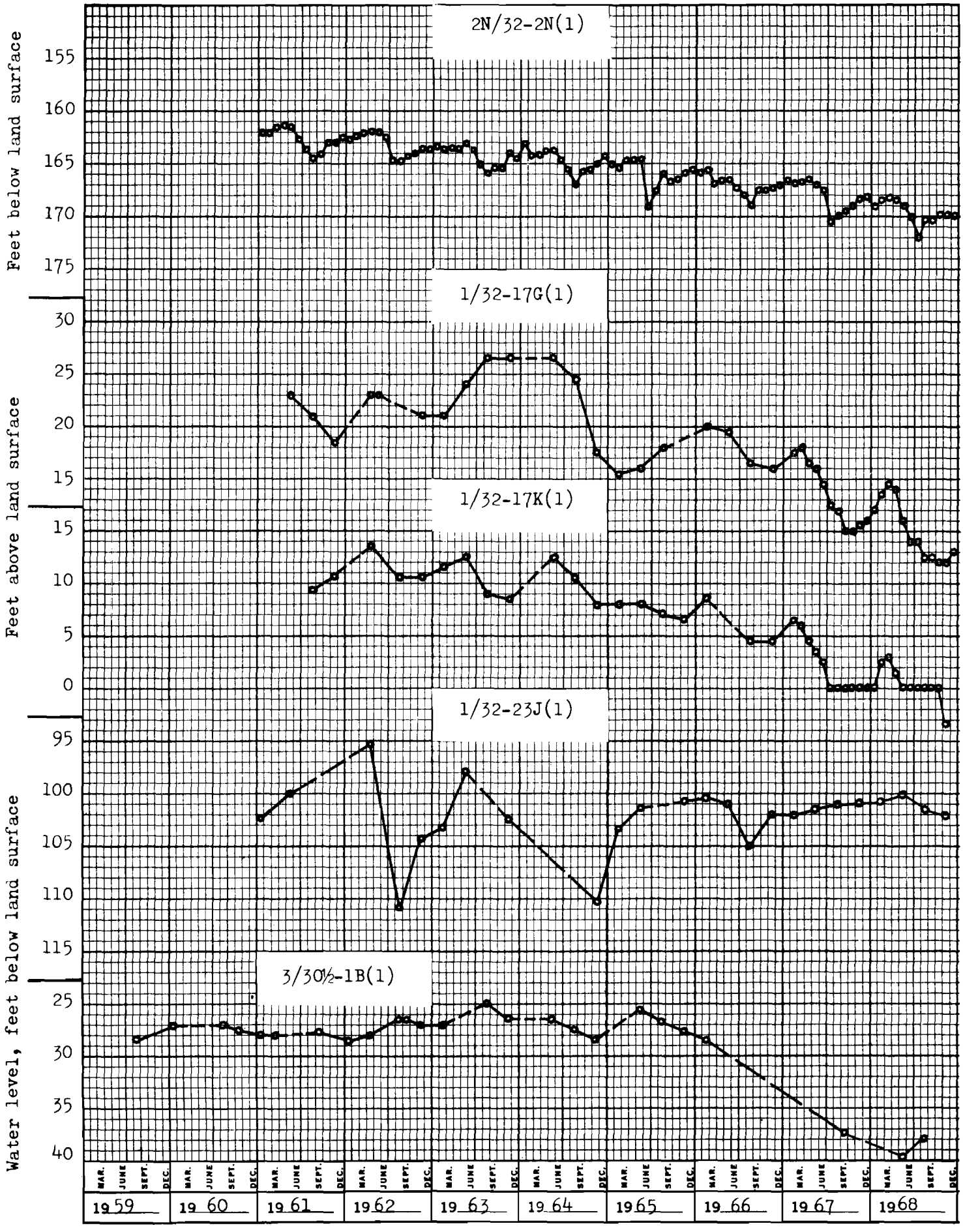
3/30½-1B(1) (Joseph Pedro) is a 99-foot drilled well in basalt located about 10 miles SW of Pilot Rock. Periodic water level measurements available from 1953 to date.

REFERENCES

Brown, Stuart G., 1955, Inquiry into the reported interference between artesian wells near Pilot Rock, Oregon: U. S. Geological Survey open-file report.

Hogenson, G. M., 1964, Geology and ground water of the Umatilla River Basin, Oregon: U. S. Geological Survey Water Supply Paper 1620.

PENDLETON-PILOT ROCK AREA (6)



GRANDE RONDE VALLEY (7)

The Grande Ronde Valley is a broad, deep structural valley that has been partially filled with lake and stream deposited clays, silts, sands, and gravels. The occurrence of coarse-grained sand and gravel deposits is usually limited to the alluvial fans that have formed where the larger streams flow into the valley. The deeper materials in the basin fill are fine-grained silts and clays.

The basin is underlain by the Columbia River Basalt Formation which contains confined ground water. Wells drilled into the basalt generally flow at the surface.

New irrigation wells have been drilled during the past few years. Some of these develop several thousand gallons per minute from the sand and gravel deposits.

It appears that the permeable alluvial deposits can withstand a large additional development without creating a serious problem of declining water levels. At the present time, large amounts of the precipitation which would be available for ground water recharge is being rejected because the ground water reservoir in the alluvial deposits are full to overflowing. Additional pumping during the irrigation season would cause a lowering of the water table and create additional ground water storage space.

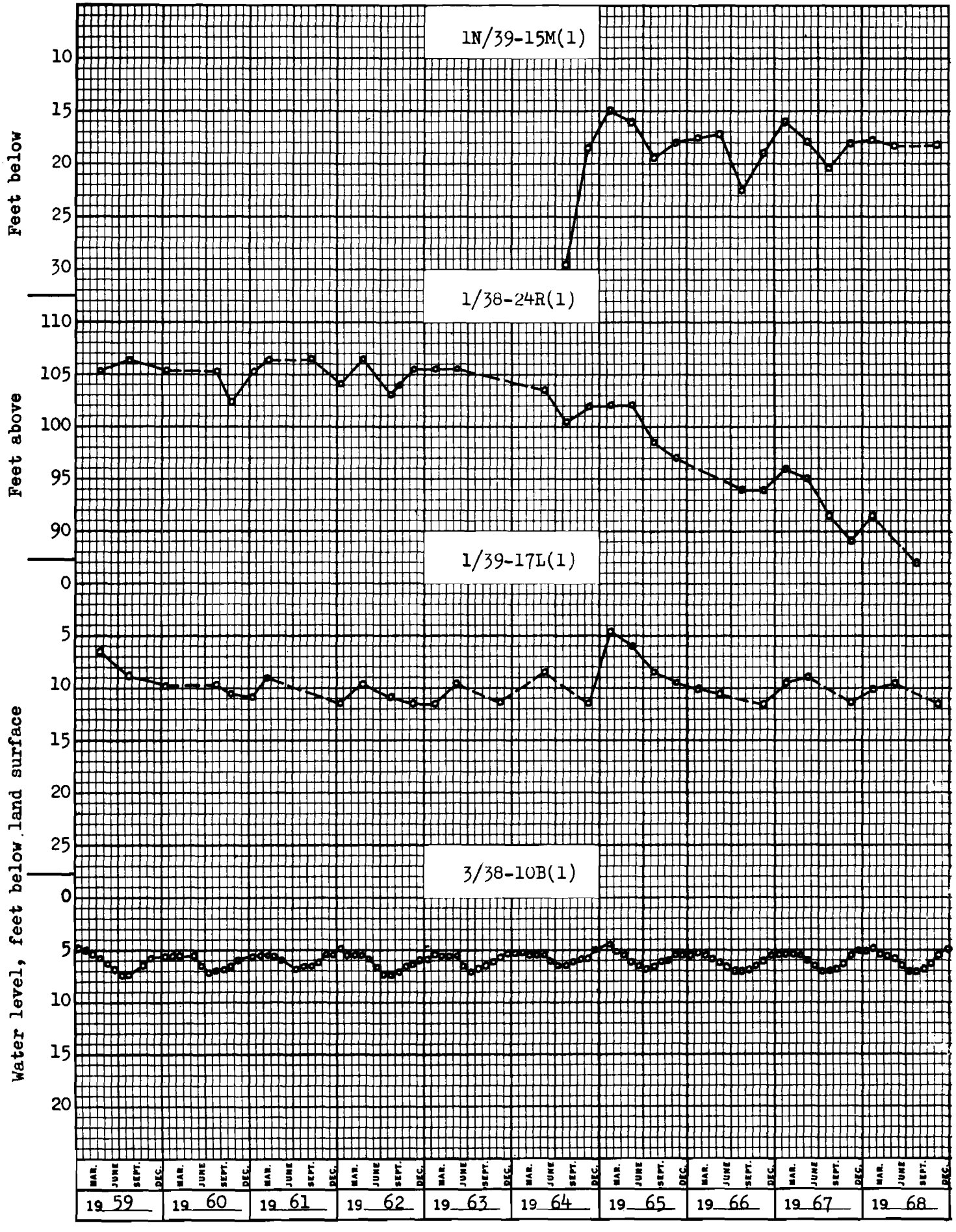
OBSERVATION WELLS

1N/39-15M(1)	(Jim Morgan) is a 130-foot drilled well in sand and gravel located near Elgin.
1/38-24R(1)	(H. L. Wagner) is a 1150-foot artesian well drilled in basalt located about 3 miles west of Imbler. Periodic water level measurements available from 1950 to date.
1/39-17L(1)	(A. F. Furman) is a 44.6-foot drilled well in sand located near Imbler. Periodic water level measurements available from 1940 to date.
3/38-10B(1)	(Union County) is a 11-foot dug well in sand and gravel located about 2 miles east of La Grande. Periodic water level measurements available from 1936, and from 1938 to date.

REFERENCES

Hampton, E. R., and Brown, S. G., 1964, Geology and ground water resources of the Upper Grande Ronde River Basin, Union County, Oregon: U. S. Geological Survey Water Supply Paper 1597.

GRANDE RONDE VALLEY (7)



GRANDE RONDE VALLEY (7)

OBSERVATION WELLS

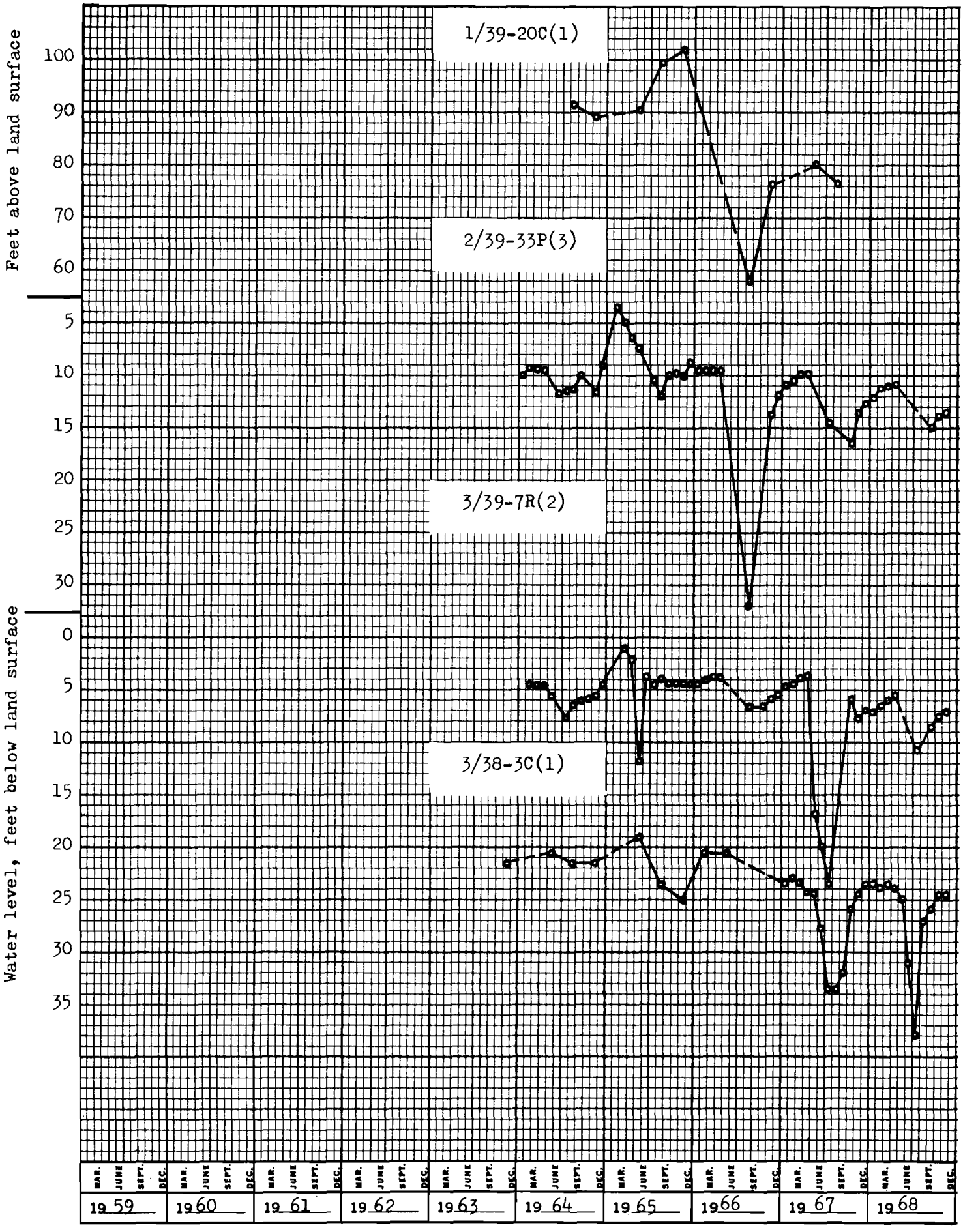
1/39-20C(1) (Clayton Fox) is a 1468-foot artesian well drilled in basalt located about one mile north of Imbler.

2/39-33P(3) (Wilfred Hamann) is a 255-foot drilled well in sand and gravel located about 6 miles east of La Grande.

3/39-7R(2) (Stanley Weishaar) is a 375-foot drilled well in sand and gravel located about 5 miles SE of Island City.

3/38-3C(1) (City of Island City) is a 315-foot drilled well in gravel located within Island City.

GRANDE RONDE VALLEY (7)



BAKER VALLEY (8)

The Baker Valley is a broad structural basin that has been partially filled with lake and stream deposits. The coarser-grained sand and gravel deposits are confined to the large alluvial fans that have been formed by streams flowing out of the Elkhorn Mountains.

At many places in the Baker Valley the water table is at or near land surface. This indicates that the ground water reservoirs are full. Ground water developments in some areas of the Valley would aid in solving drainage problems. A 650-foot well was drilled near the City of Baker during 1965 that was tested at a yield of 2,000 gallons per minute with 100 feet of drawdown. Part of the ground water was developed from the alluvial gravels and part from the permeable volcanic rocks that were encountered in the bottom 150 feet of the well.

OBSERVATION WELLS

8/39-22F(1) (Baker County) is a 12-foot dug well in sand & gravel located in the Baker Valley near Wingville. Periodic water level measurements available from 1938 to date.

8/40-19D(1) (Baker County) is a 9-foot dug well in sand & gravel located in the Baker Valley near Wingville. Periodic water level measurements available from 1938 to date.

9/39-2N(1) (Kermit Hansen) is a 321-foot drilled well in gravel located about 4 miles NW of Baker. Periodic water level measurements available from 1949 to date.

9/40-18Q(1) (Paul V. Hill) is a 575-foot drilled well in gravel located about one mile west of Baker.

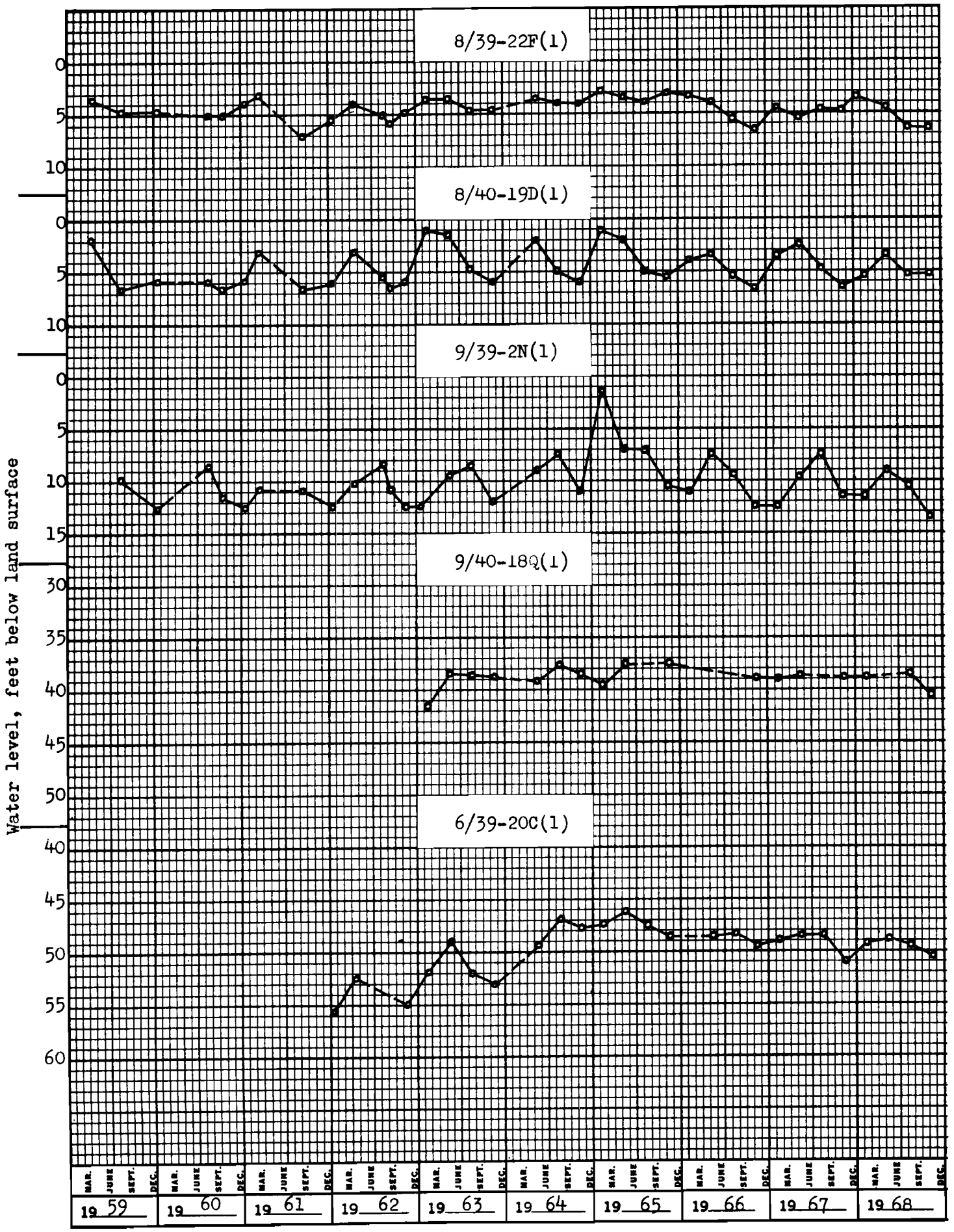
6/39-20C(1) (Ed McCanse) is a 562-foot drilled well in gravel located about 2 miles west of North Powder.

REFERENCES

Ducret, G. L. Jr., and Anderson, D. B., 1965, Records of wells, water levels and chemical quality of water in Baker Valley, Baker County, Oregon.

Trauger, Frederick D., 1951, Ground water resources of Baker Valley, Baker County, Oregon: U. S. Geological Survey open-file report.

BAKER VALLEY (8)



UPPER JOHN DAY VALLEY (9)

The upper John Day Valley is a long, narrow valley that extends from Dayville to Prairie City. The valley floor is generally less than a mile in width and is bordered by steep valley walls. The flood plain is underlain by coarse alluvial deposits of sand, gravel and boulders. Ground water in these permeable deposits is at most places hydraulically connected with the adjacent river. Ground water developments from the alluvial deposits have been made through the use of sumps or ponds and shallow drilled wells. The extreme permeability of the alluvial deposits and their shallow occurrence makes the ground water readily subject to pollution problems.

At places, as at John Day, the Columbia River Basalt Formation extends below the alluvial deposits and some deep wells have encountered confined ground water in the lavas. The John Day formation which underlies the alluvial deposits in the Dayville area has very low permeability and is generally capable of yielding only small supplies of ground water.

OBSERVATION WELLS

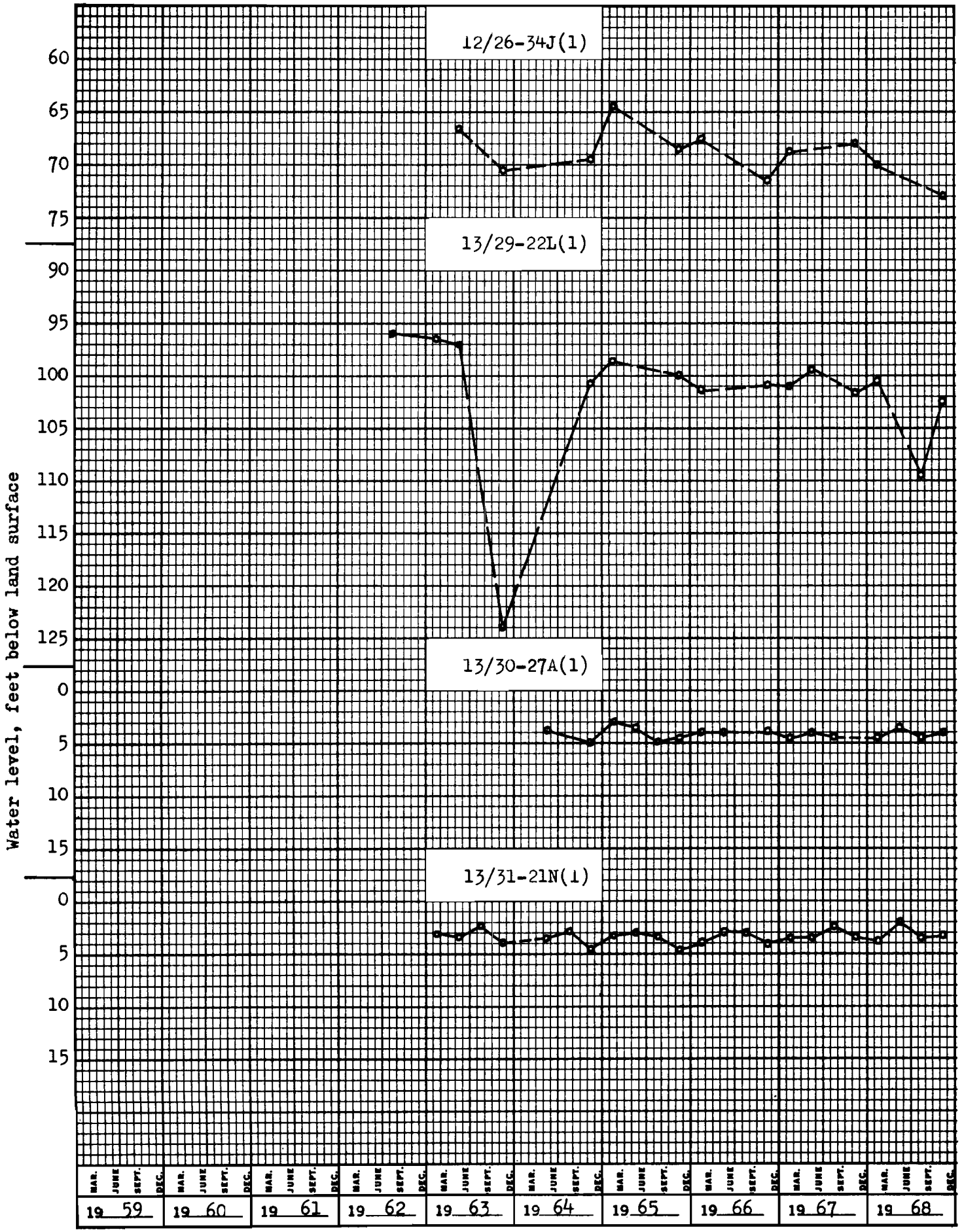
12/26-34J(1) (Dayville Cemetery) is a 465-foot drilled well in sand & gravel located about 3 miles SW of Dayville.

13/29-22L(1) (Curtis Martin) is a 215-foot drilled well in gravel located about 6 miles west of Mt. Vernon.

13/30-27A(1) (State Highway Department - Clyde Holliday Wayside Park) is a 155-foot drilled well in basalt located about one mile east of Mt. Vernon.

13/31-21N(1) (Mt. View Country Club) is a 10-foot dug well in gravel located about one mile west of John Day.

UPPER JOHN DAY VALLEY (9)



COW VALLEY AREA (10)

Cow Valley is a small upland basin in northern Malheur County that as declared a critical ground water area in 1959 on the basis of declining ater levels. The valley has been closed to further ground water develop- ents and existing irrigation wells have been restricted to the duty of ater which is three acre feet per acre of irrigated land. Ground water ithdrawals for the period of 1951-1968 are given below:

GROUND WATER PUMPAGE

Year	Acre Feet	Year	Acre Feet
1951	1826	1960	4722
1952	3451	1961	5495
1953	2564	1962	5110
1954	5494	1963	3520
1955	6058	1964	3553
1956	5611	1965	4344
1957	5980	1966	4696
1958	5080	1967	4211
1959	5588	1968	4693

OBSERVATION WELLS

15/40-2J(1) (Max Holloway No. 1) is a 421-foot drilled well in sand and gravel located within Cow Valley. Periodic water level measurements available from 1950 to date.

15/40-2N(1) (Rankin Crow No. 2) is a 310-foot drilled well in sand and gravel located within Cow Valley. Periodic water level measurements available from 1950 to date.

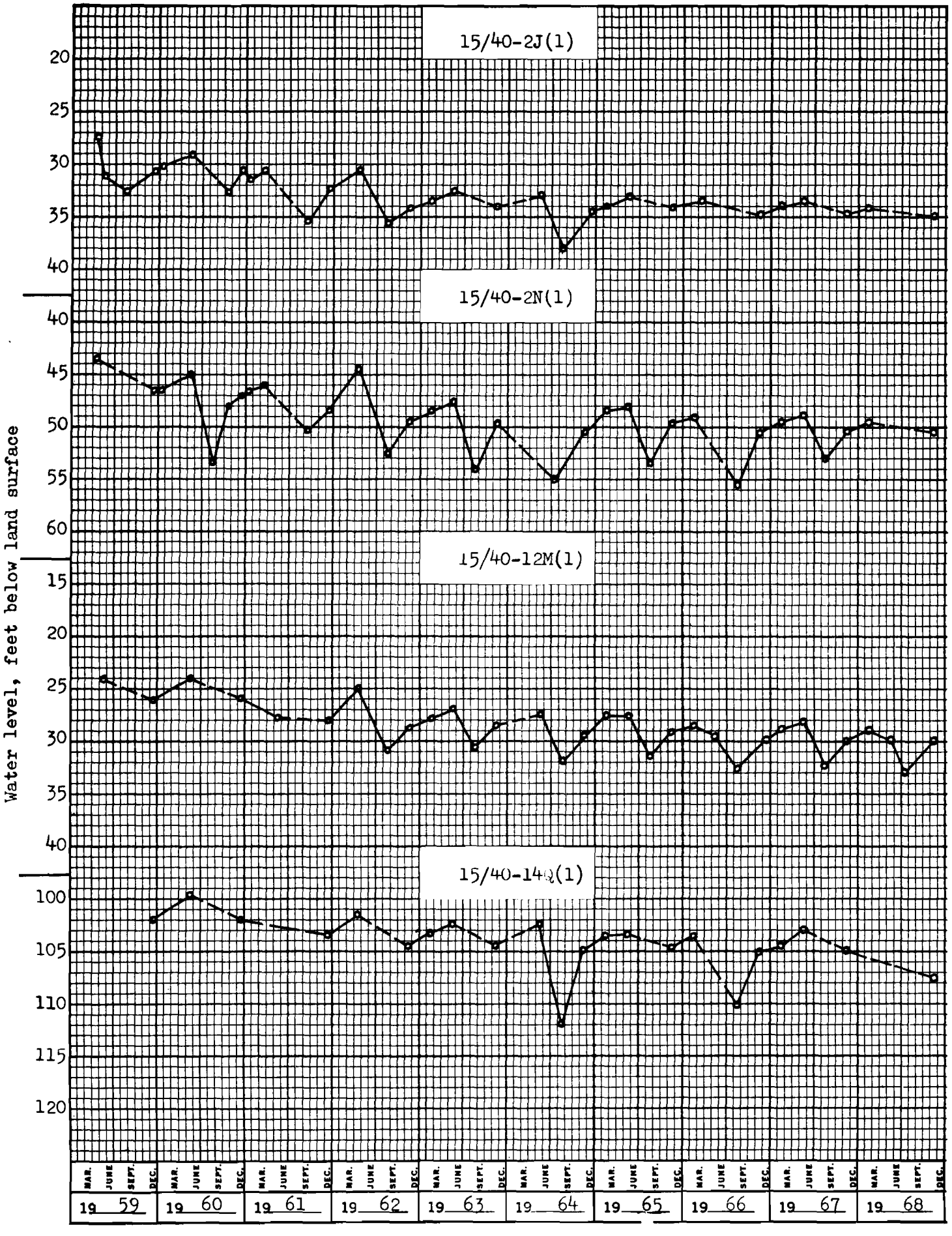
15/40-12M(1) (Guss Davis No. 3) is a 280-foot drilled well in basalt located within Cow Valley. Periodic water level measurements available from 1955 to date.

15/40-14Q(1) (Rankin Crow No. 8) is a 248-foot drilled well in basalt located within Cow Valley. Periodic water level measurements available from 1954 to date.

REFERENCES

Brown, S. G., and Newcomb, R. C., 1962, Ground water resources of Cow Valley, Malheur County, Oregon: U. S. Geological Survey Water Supply Paper 1619-M.

COW VALLEY AREA (10)



COW VALLEY AREA (10)

OBSERVATION WELLS

15/40-1C(1) (Altha Anderson) is a 330-foot drilled well in sand & gravel located within Cow Valley. Periodic water level measurements available from 1954 to date.

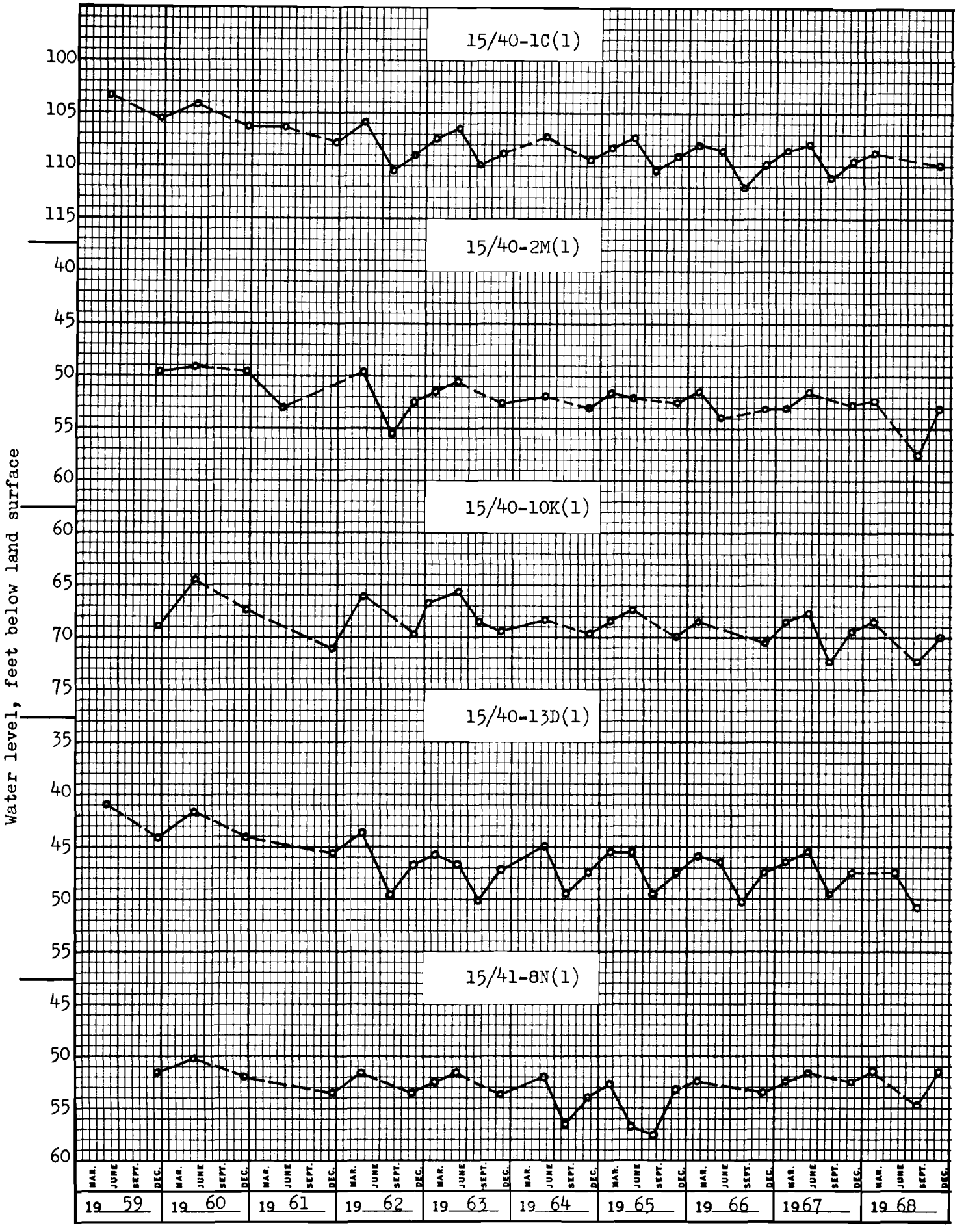
15/40-2M(1) (Max Holloway #2) is a 535-foot drilled well in sand & gravel located within Cow Valley. Periodic water level measurements available from 1954 to date.

15/40-10K(1) (Rankin Crow #9) is a 1000-foot drilled well in sand & gravel located within Cow Valley. Periodic water level measurements available from 1954 to date.

15/40-13D(1) (Guss Davis #1) is a 300-foot drilled well in basalt located within Cow Valley. Periodic water level measurements available from 1955 to date.

15/41-8N(1) (Rankin Crow #6) is a 338-foot drilled well in basalt located within Cow Valley. Periodic water level measurements available from 1953 to date.

COW VALLEY AREA (10)



SOUTHERN MALHEUR AREA (11)

The Southern Malheur Area is located within the Basin & Range country of South East Oregon. The area has been broken by block faulting into may basin and mountain ridge areas. The faulting has also divided the area into numerous disconnected ground-water reservoirs. A large part of the area is underlain by permeable volcanic rocks, however, the low precipitation incident to the area limits the amount of ground-water recharge. The main source of recharge is snowmelt runoff from the ridges and hills during the spring months. To date there has been very little ground-water development in this area, however, the area should be able to sustain moderate sized ground-water developments without serious problems.

OBSERVATION WELLS

30/46-2H(1) (Jordan Valley Cemetery District) is a 221-foot drilled well in sandstone located in Jordan Valley.

30/46-10N(5) (Jaca Brothers) is a 420-foot drilled well in sand located about 2 miles SW of Jordan Valley.

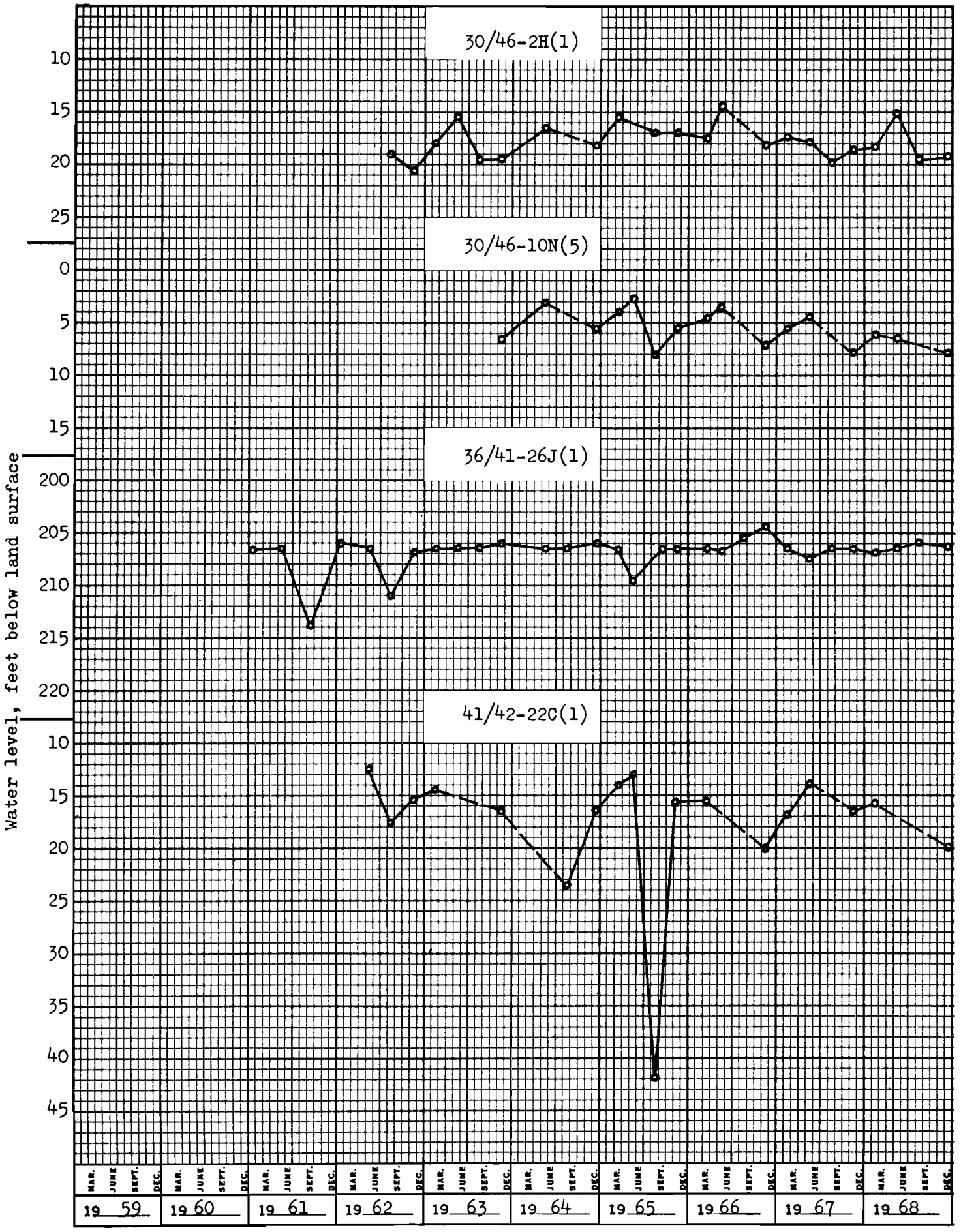
36/41-26J(1) (State Highway Department - Basque Maintenance Station) is a 222-foot drilled well in basalt located about one mile NW of Basque.

41/42-22C(1) (Lucky 7 Ranch) is a 615-foot drilled well in gravel located about 2 miles west of McDermitt.

REFERENCES

Newcomb. R. C., 1961 Ground water in the western part of the Cow Creek and Soldier Creek grazing units, Malheur County, Oregon: U. S. Geological Survey Water Supply Paper 1475-E.

SOUTHERN MALHEUR AREA (11)



SOUTHERN HARNEY AREA (12)

The Southern Harney area, like the Southern Malheur area, has been divided by faulting into may basins and ridges. Steens Mountain, the largest and most prominent fault-block mountain in the northwest, is located in this area. This mountain is bordered on the east by the Alvord Valley and on the west by the Donner and Blitzen Valley and the Catlow Valley. The various basins in the area have been partially filled with alluvium derived from the adjacent ridges and hills. Recharge comes chiefly from snowmelt during the spring months. The larger basins as the Alvord Valley, the Donner and Blitzen Valley and the Catlow Valley are believed to contain large supplies of ground water. Recharge to these larger basins is related to the snowfall on the Steens Mountain.

OBSERVATION WELLS

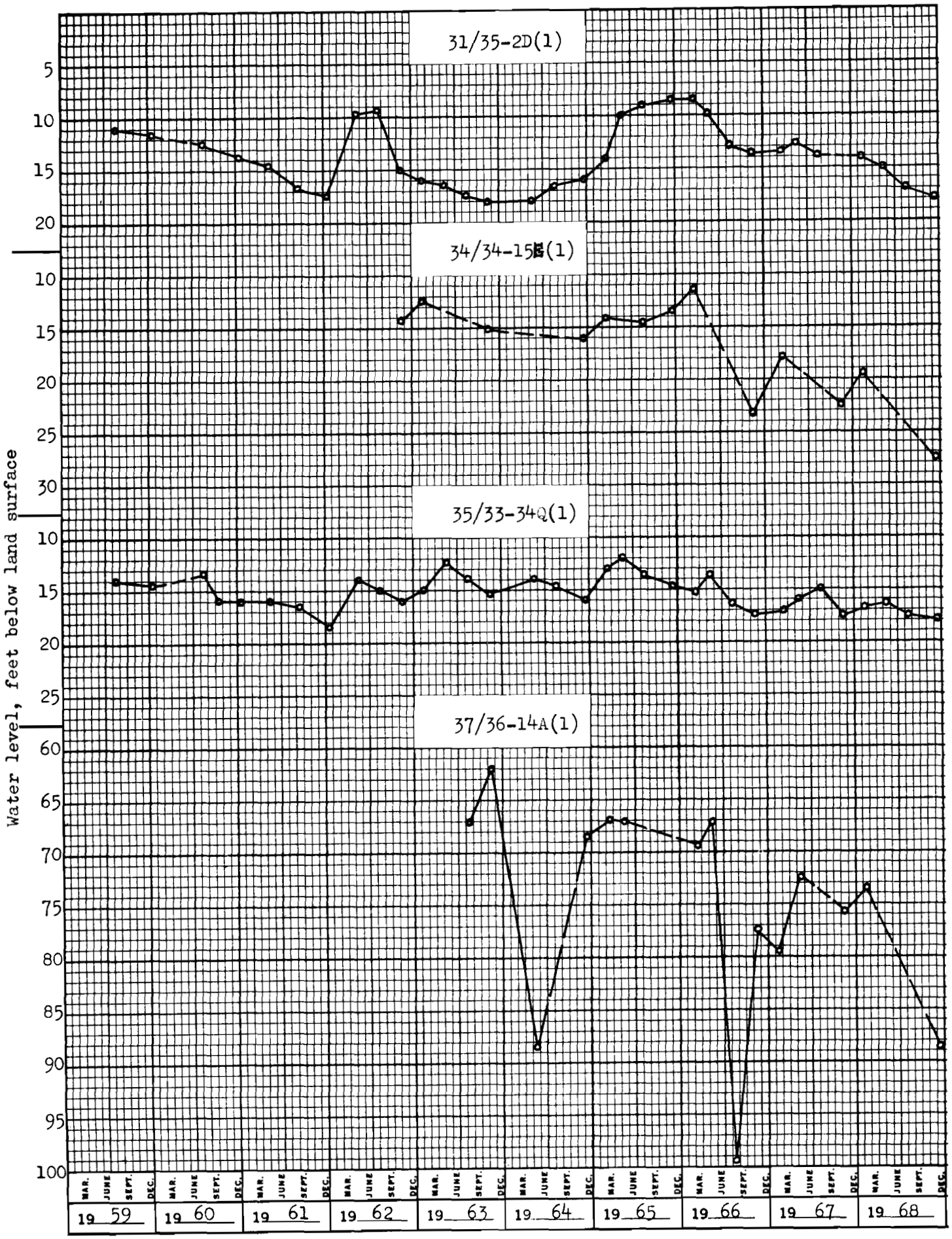
31/35-2D(1) (Fred Pallock) is a 32-foot drilled well in alluvium located near Juniper Lake. Periodic water level measurements available from 1954 to date.

34/34-15E(1) (Alvord Ranch) is a 300-foot drilled well in lava located about 8 miles NE of Andrews.

35/33-34Q(1) (Andrew Shull) is a 170-foot drilled well in sand & gravel located near Andrews. Periodic water level measurements available from 1958 to date.

37/36-14A(1) (Whitehorse Ranch) is a 792-foot drilled well in basalt located about 28 miles NE of Fields.

SOUTHERN HARNEY AREA (12)



HARNEY BASIN (13)

The Harney Basin is a large closed structural basin that has been partially filled with lake and stream deposits and volcanic debris. The water table lies close to land surface beneath the entire basin floor and the underlying ground-water reservoirs are near full capacity. From the available information, it appears that this basin can sustain large ground-water developments without serious problems of declining water levels.

OBSERVATION WELLS

23/27-30B(1) (Green Valley Ranch) is a 268-foot drilled well in gravel (?) located about one mile NW of Riley.

23/31-16K(1) (T. Allen Jones) is a 300-foot drilled well in gravel located about 2 miles SE of Burns. Periodic water level measurements available from 1930-1932, 1956 and from 1960 to date.

24/30-26R(1) (John Campbell) is a 501-foot drilled well in sand & gravel located about 9 miles SW of Burns.

25/31-4M(1) (James Stahl) is a 170-foot drilled well in sand & gravel located about 10 miles SE of Burns.

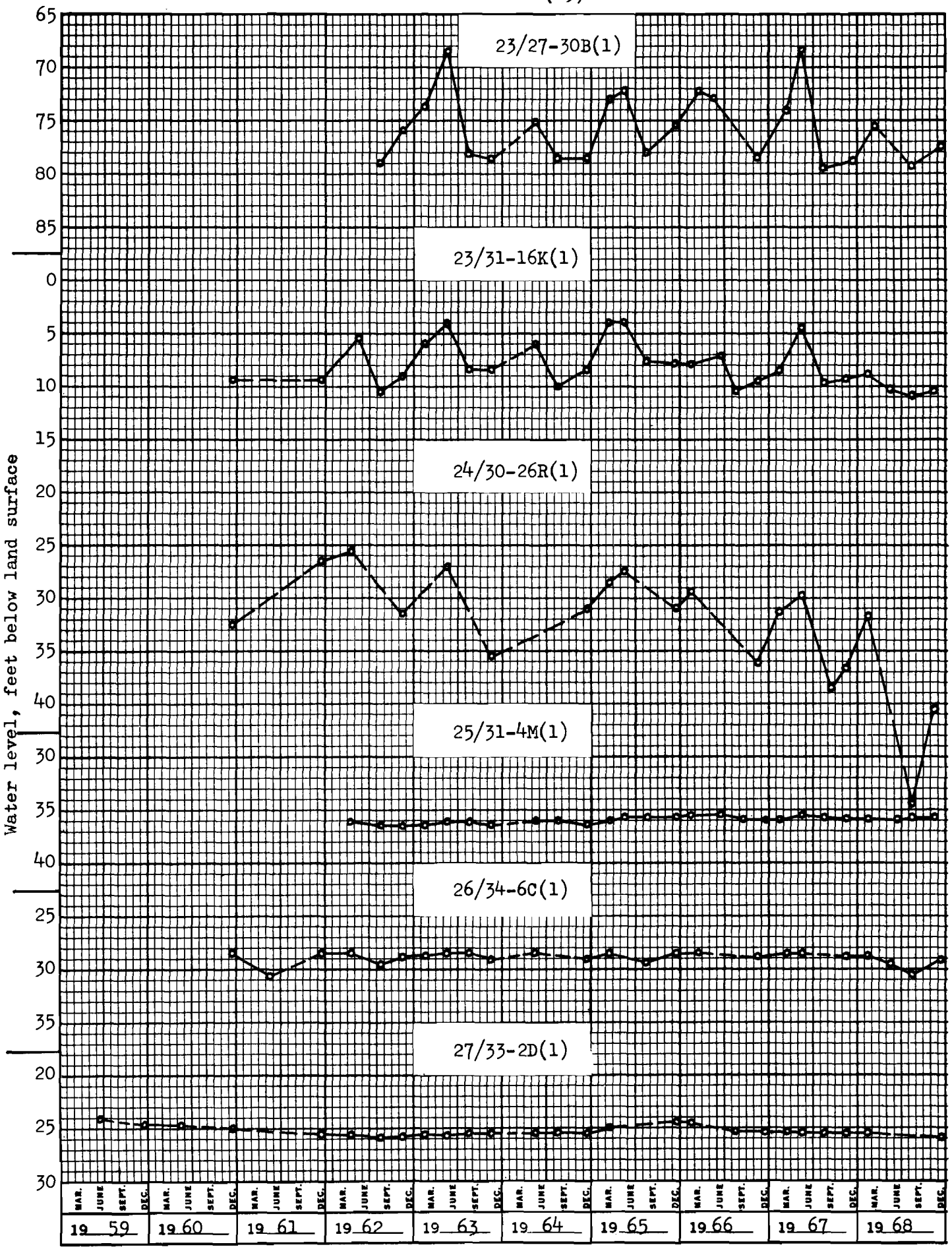
26/34-6C(1) (John J. Fecht) is a 260-foot drilled well in sand located about 4½ miles south of Crane.

27/33-2D(1) (R. F. Upton) is a 176-foot drilled well in lava & cinders located about 2 miles SW of New Princeton.

REFERENCES

Piper, A. M., et al, 1939, Geology and ground water resources of the Harney Basin, Oregon: U. S. Geological Survey Water Supply Paper 841.

HARNEY BASIN (13)



HARNEY BASIN (13)

OBSERVATION WELLS

22/31-34N(1) (Burtt Schroder, Formerly Lazraus) is a 288-foot drilled well in sand & gravel located about 3 miles NE of Burns. Periodic water level measurements available from 1930 - 1936 and from 1938 to date.

23/31-11Q(1) (E. N. Sewell) is a 120-foot drilled well in gravel located about 4 miles east of Burns.

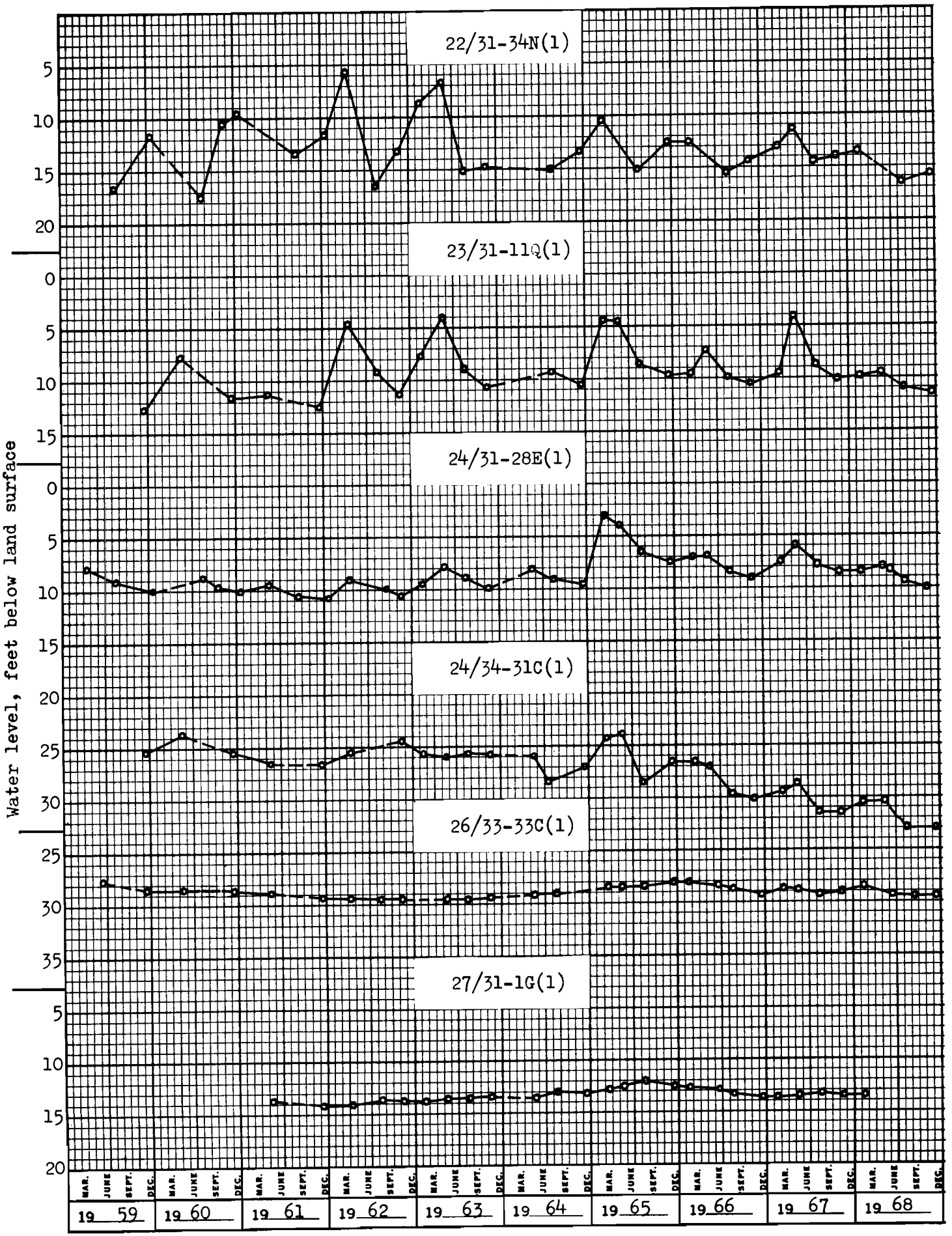
24/31-28E(1) (Harney County) is a 17-foot dug well in gravel located about 9 miles SE of Burns. Periodic water level measurements available from 1936 and from 1938 to date.

24/34-31C(1) (John Rossberg) is a 305-foot drilled well in lava & cinders located about 2 miles north of Crane.

26/33-33C(1) (D. Edward Owen, Formerly Forslund) is a 300-foot drilled well in cinders located about 3½ miles west of New Princeton. Periodic water level measurements available from 1958 to date.

27/31-1G(1) (John Crow) is a 118-foot drilled well in basalt located near the south shore of Malheur Lake.

HARNEY BASIN (13)



WARNER VALLEY (14)

Warner Valley is a long narrow structural valley located in southeastern Lake County. The valley is bordered by fault block mountains that have contributed materials for the partial filling of this basin. This valley was the site of the spectacular "hot water" geyser that developed in a deep test well drilled on the Crump Ranch a few years ago.

In general, most of the ground-water reservoirs underlying this basin are filled and water levels are at or near land surface. It is believed that large supplies of ground water underlie this valley.

OBSERVATION WELLS

35/24-9J(1) (U.S. B.L.M.) is a 376.5-foot drilled well in basalt located about 8 miles north of Hart Lake. Periodic water level measurements available from 1949 to date.

36/24-27D(2) (Con Lynch) is a 255-foot drilled well in cinders (?) located about one mile east of Plush.

36/24-33B(3) (Con Taylor) is a 262-foot drilled well in gravel & lava located about one mile east of Plush.

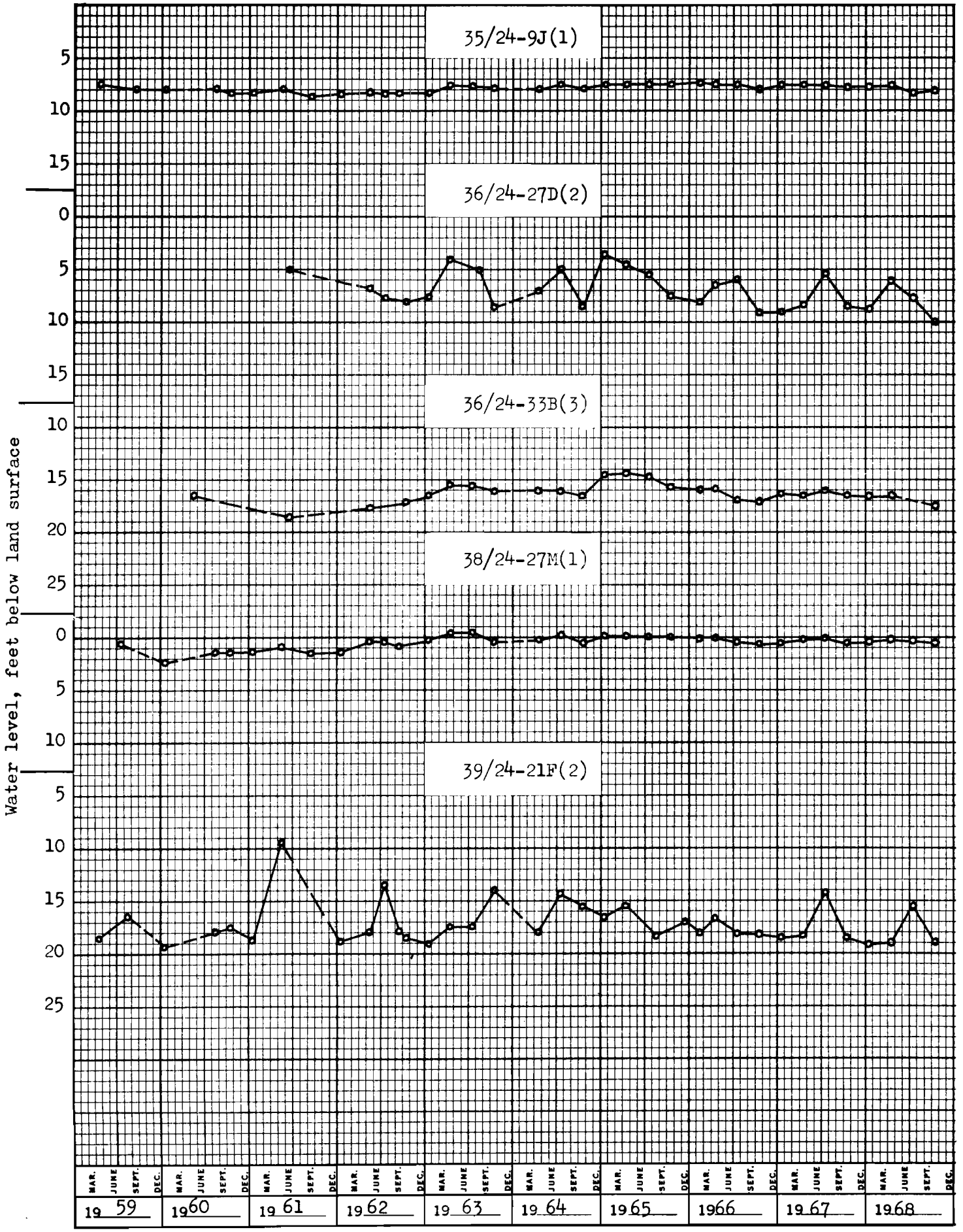
38/24-27M(1) (Charles Crump) is a 81-foot drilled well in gravel located near Crump Lake. Periodic water level measurements available from 1948 to date.

39/24-21F(2) (J. G. Dyke) is a 165-foot drilled well in gravel located in Adel. Periodic water level measurements available from 1948 to date.

REFERENCES

Trauger, Frederick D., 1950, Basic ground water data in Lake County, Oregon: U. S. Geological Survey open file report.

WARNER VALLEY (14)



GOOSE LAKE BASIN (15)

The Goose Lake Basin is a large structural basin located in southeastern Lake County. This basin has been partially filled with stream and lake deposits. The stream deposited sands and gravels usually occur where alluvial fans have been built into the basin. Some of the alluvial deposits have been buried by fine-grained lake sediments which tend to confine the ground water and cause some wells to flow. Buried organic debris in the basin fill deposits often creates water quality problems with respect to iron and hydrogen sulfide and methane gas.

In general, the water table stands close to land surface and a large quantity of ground water is in storage in this basin. Ground-water developments for irrigation are few in number but are expected to increase.

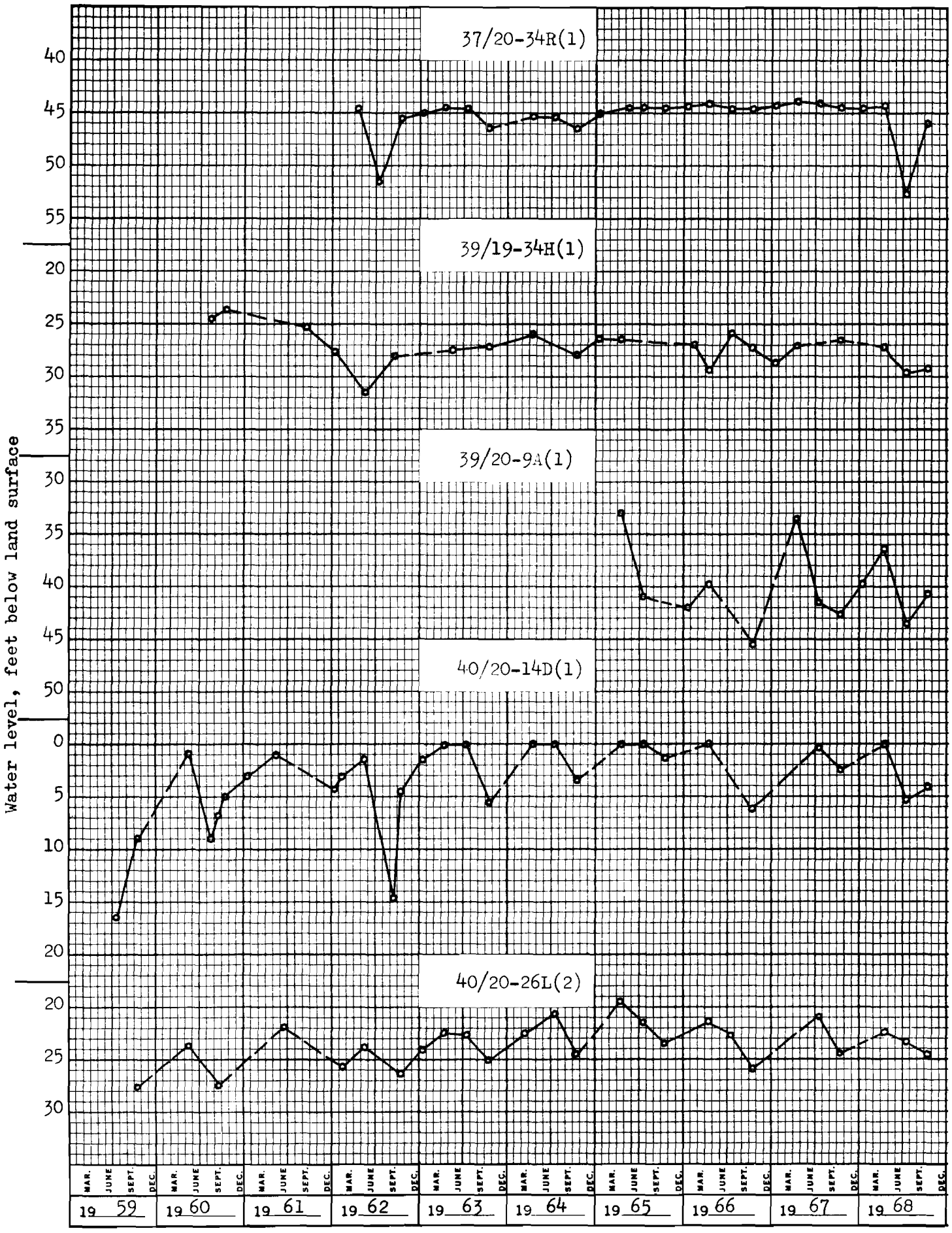
OBSERVATION WELLS

37/20-34R(1)	(Robert Weir) is a 808-foot drilled well in gravel located about 9 miles north of Lakeview.
39/19-34H(1)	(William Hoffman) is a 110-foot drilled well in sand & gravel located about 7 miles west of Lakeview.
39/20-9A(1)	(Lakeview Mining) is a 800-foot drilled well in sand & gravel located in Lakeview.
40/20-14D(1)	(Snyder & Alexis) is a 305-foot drilled well in sand & gravel located about 5 miles south of Lakeview.
40/20-26L(2)	(Neal Elliott) is a 190-foot drilled well in sand & gravel located about 8 miles south of Lakeview.

REFERENCES

Trauger, Frederick D., 1950, Basic ground water data in Lake County, Oregon: U. S. Geological Survey open file report.

GOOSE LAKE BASIN (15)



YONNA VALLEY (16)

Yonna Valley is a broad basin in Southern Klamath County that is surrounded by fault block mountains. The valley is drained by several small streams that are tributary to Lost River.

A large part of the valley floor is underlain by sedimentary strata of siltstone, tuffaceous sandstone, diatomite and volcanic ash. These strata, which have been named the Yonna Formation, have low permeability and are generally capable of yielding only small supplies of ground water. A sequence of volcanic rock which underlies the Yonna Formation generally has high permeability and is generally capable of yielding large supplies of ground water to deep wells. It appears that the ground-water reservoirs in the Yonna Valley can withstand substantial development without serious problems.

OBSERVATION WELLS

38/11-6R(1) (B. J. Jendrzejewski) is a 194-foot drilled well in broken lava located about 5 miles NE of Dairy. Periodic water level measurements available from 1957 to date.

38/11½-12N(2) (Frank Challis) is a 150-foot drilled well in porous lava located about 4 miles NE of Diary. Periodic water level measurements available from 1949 to date.

38/11½-13N(1) (William Konig) is a 600-foot drilled well in diatomaceous material located about 3 miles NE of Dairy. Periodic water level measurements available from 1948 to date.

38/11½-15R(1) (Frank R. White) is a 495-foot drilled well in lava & cinders located about 2 miles north of Dairy. Periodic water level measurements available from 1948 and from 1950 to date.

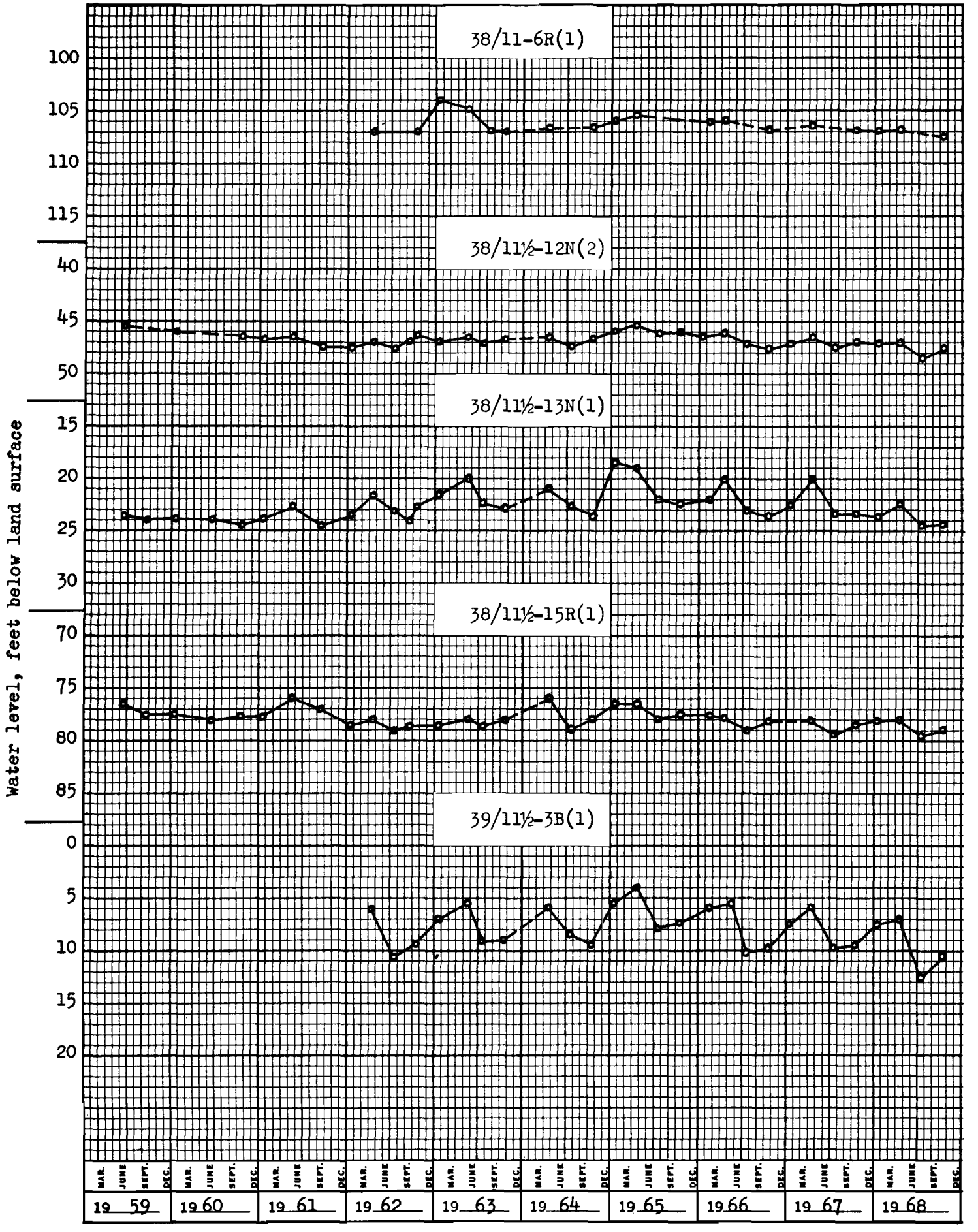
39/11½-3B(1) (L. J. Horton) is a 102-foot drilled well in lava & cinders located about one mile south of Dairy. Periodic water level measurements available from 1957 to date.

REFERENCES

Meyers, Joseph D. and Newcomb, R. C., 1952, Geology and ground water resources of the Swan Lake - Yonna Valleys area, Klamath County, Oregon: U. S, Geological Survey open file report.

Newcomb, R. C. and Hart, D. H., 1958, Preliminary report on the ground water resources of the Klamath River Basin, Oregon: U. S. Geological Survey open file report.

YONNA VALLEY (16)



SWAN LAKE VALLEY (17)

The Swan Lake Valley is a closed basin lying immediately west of Yonna Valley. This rift valley, has been partially filled with fine-grained lake deposits. These fine grained lake beds are believed capable of yielding only small supplies of ground water.

Large ground-water supplies have been obtained from deep wells drilled into the volcanic rocks that surround and underlie the lake beds. A 295-foot well drilled into the volcanic rocks in 1965 was tested at 2,850 gallons per minute with only eight feet of drawdown.

OBSERVATION WELLS

37/10-8N(1) (Edgewood Ranch) is a 281-foot drilled well in cinders located about 10 miles NE of Klamath Falls.

37/10-29K(2) (Edgewood Ranch) is a 800-foot drilled well in gravel located about 8 miles NE of Klamath Falls. Periodic water level measurements available from 1949 to date.

38/10-22C(1) (Mike Short) is a 460-foot drilled well in lava located about 8 miles NE of Klamath Falls. Periodic water level measurements available from 1957 to date.

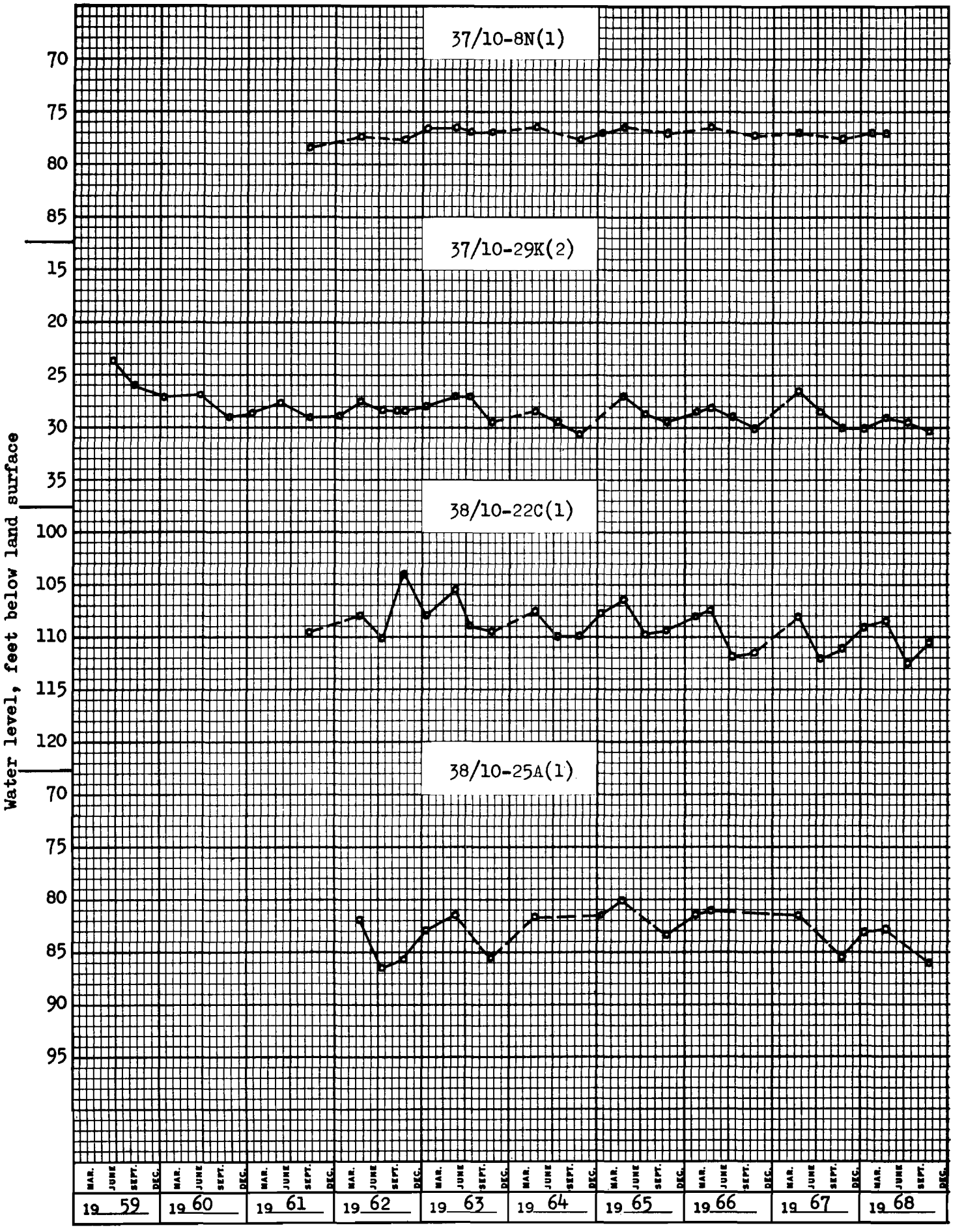
38/10-25A(1) (Garrison Mitchell) is a 524-foot drilled well in lava & cinders located about 4 miles west of Dairy. Periodic water level measurements available from 1957 and 1958.

REFERENCES

Meyers, Joseph D. and Newcomb, R. C., 1952, Geology and ground water resources of the Swan Lake - Yonna Valleys area, Klamath County, Oregon: U. S. Geological Survey open file report.

Newcomb, R. C. and Hart, D. H., 1958 Preliminary report on the ground water resources of the Klamath River Basin, Oregon: U. S. Geological Survey open file report.

SWAN LAKE VALLEY (17)



SPRAGUE RIVER VALLEY (18)

The Sprague River Valley, which extends from the Community of Sprague River to Bly, is underlain by some of the most productive ground-water reservoirs in the State. The productive wells in the Bly area develop ground water from porous lava and cinders. One well was tested at 3,500 gallons per minute with no apparent drawdown. In the Beatty area, deep wells drilled into the lavas and cinders underlying the Yonna Formation develop confined ground water. Some of these wells have artesian flows of 1,000 gallons per minute or more and have pumping capacities exceeding 2,000 gallons per minute. Similar artesian conditions extend down the valley to near the community of Sprague River.

OBSERVATION WELLS

35/8-1E(1) (Henry Wolff) is a 101-foot drilled well in sand and gravel located about 9 miles east of Chiloquin. Periodic water level measurements available from 1954 to date.

35/10-19B(1) (Ted Chrume) is a 360-foot drilled well in sand located about 6 miles NW of Sprague River. Periodic water level measurements available from 1954 to date.

36/10-14G(1) (K. R. Newlun) is a 527-foot drilled well in volcanic rock located in Sprague River.

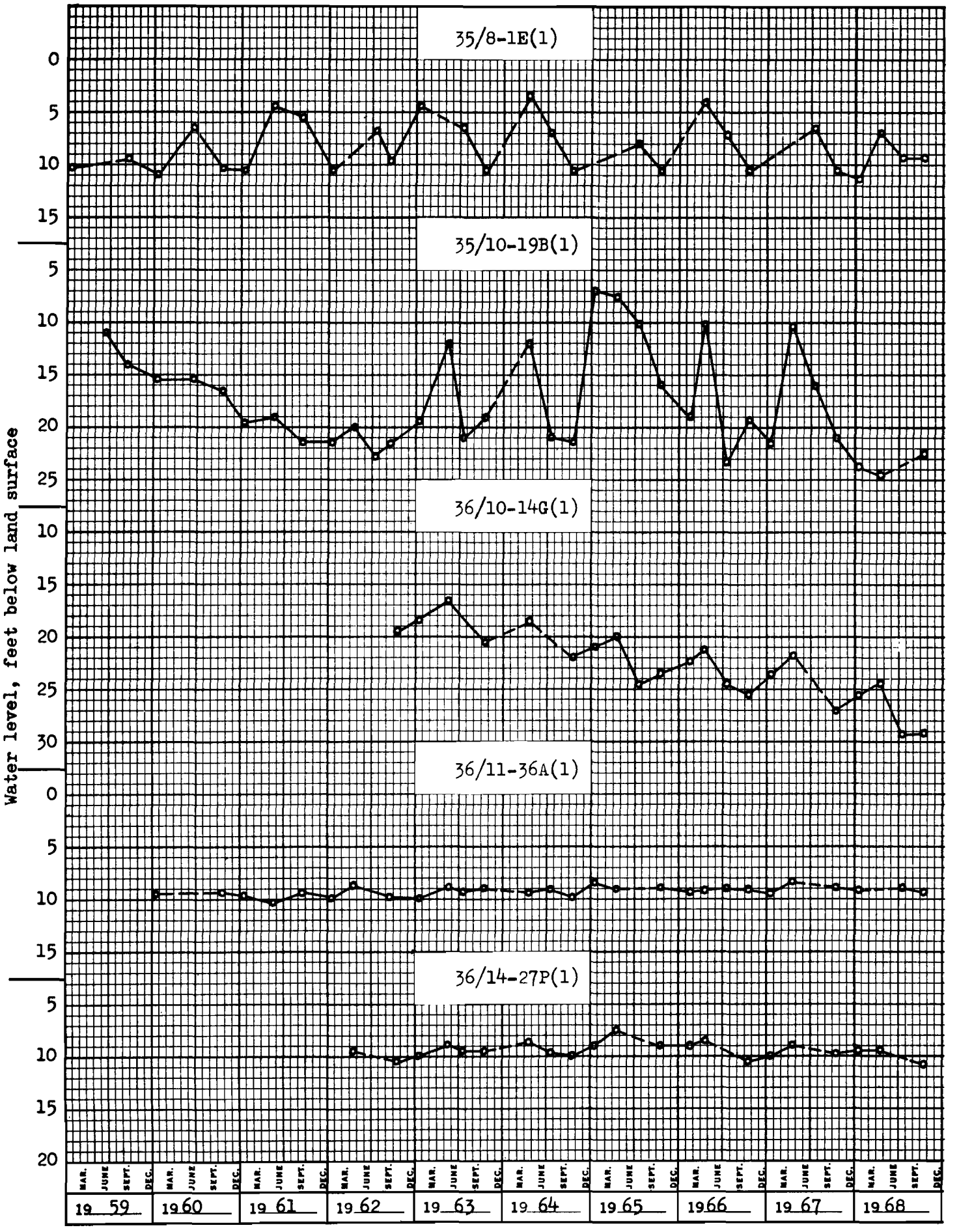
36/11-36A(1) (Bill Gallaher, formerly McBain) is a 223-foot drilled well in basalt located about 5 miles SW of Beatty. Periodic water level measurements available from 1954 to date.

36/14-27P(1) (Henry Gerber) is a 438-foot drilled well in volcanic rock located about one mile north of Bly.

REFERENCES

Newcomb, R. C., and Hart, D. H., 1958, Preliminary report on the ground water resources of the Klamath River Basin, Oregon: U. S. Geological Survey open file report.

SPRAGUE RIVER VALLEY (18)



FORT ROCK AREA (19)

The Fort Rock area is a broad structural basin in Northern Lake County and includes the Christmas Lake area and Fossil Lake area.

Recent subdivision of large tracts of land in this basin has sparked the construction of wells and the development of ground water supplies. Numerous water level measurements throughout the area show a marked similarity in the fluctuations of the water table. In general, the trend of water levels in this area is related to long term changes in the amount of annual precipitation occurring in the surrounding upland areas. New all time high water levels occurred in many wells during 1966. No serious problems of declining water levels have developed in this area.

OBSERVATION WELLS

26/14-5A(1) (V. A. Wagers) is a 83.4-foot drilled well in sand located about one mile west of Fort Rock. Periodic water level measurements available from 1940 to date.

26/14-12C(1) (Elmer Kohler) is a 200-foot drilled well in sand located about 2½ miles SE of Fort Rock. Periodic water level measurements available from 1958 to date.

26/15-31A(3) (Nick Klerk) is a 225-foot drilled well in volcanic rock located about 7 miles SE of Fort Rock. Periodic water level measurements available from 1949 to date.

27/15-4G(1) (M. Y. Parks) is a 257-foot drilled well in lava & cinders located about 9 miles SE of Fort Rock. Periodic water level measurements available from 1932, 1935-1936 and from 1938 to date.

27/16-13B(1) (Robert Morehouse) is a 560-foot drilled well in gravel & rock located in Christmas Lake Valley.

27/17-22R(2) (Century Ranch) is a 54-foot drilled well in sand located in Christmas Lake Valley. Periodic water level measurements available from 1938, 1940-1944 and from 1946 to date.

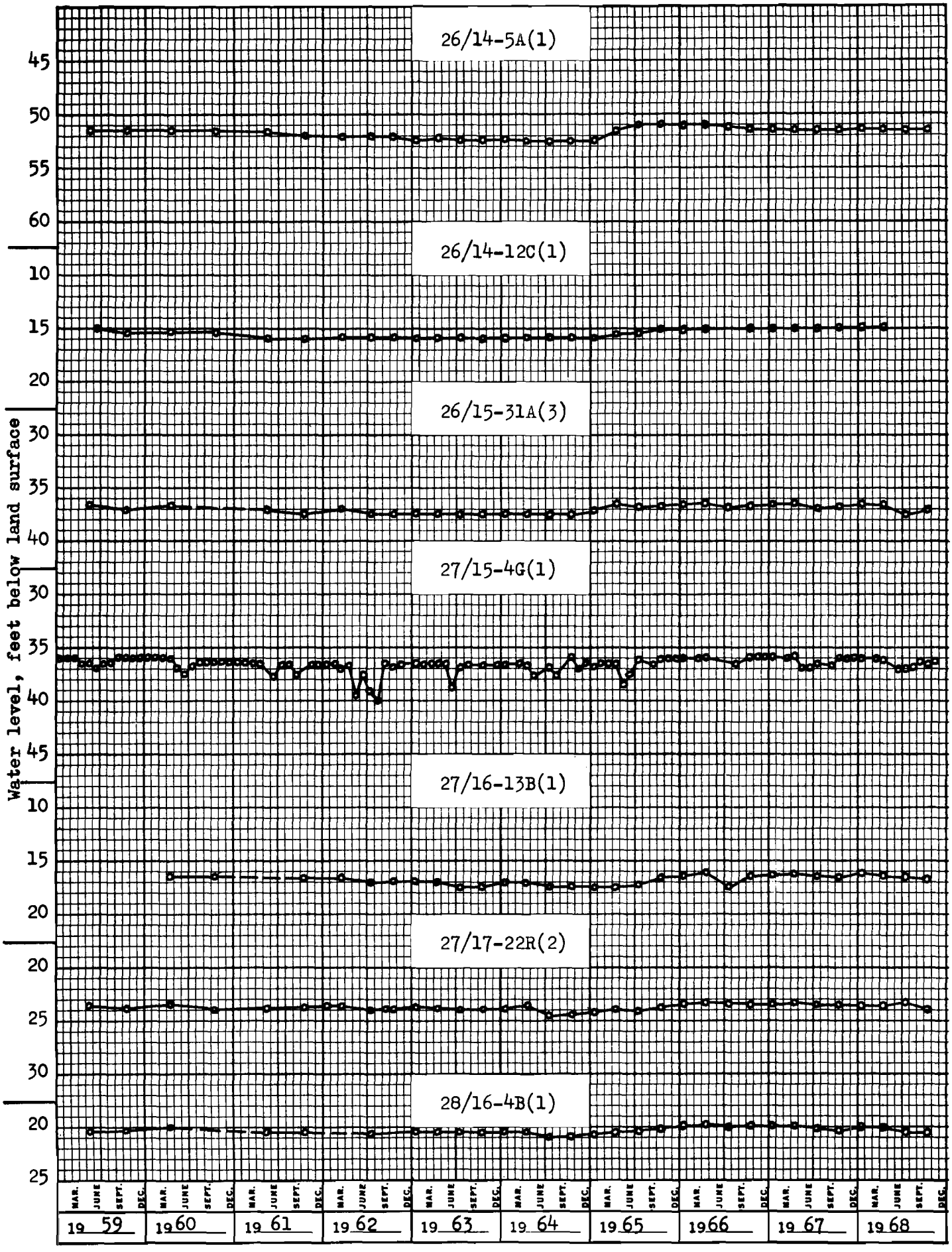
28/16-4B(1) (U.S. B.L.M.) is a 707-foot drilled well in lava located in Christmas Lake Valley. Periodic water level measurements available from 1958 to date.

REFERENCES

Hampton, E. R., 1962, Geologic factors that control the occurrence and availability of ground water in the Fort Rock Basin, Lake County, Oregon: U. S. Geological Survey Professional Paper 383-B.

Trauger, F. D., 1950, Basic ground water data in Lake County, Oregon: U. S. Geological Survey open file report.

FORT ROCK AREA (19)



CHEMULT-LAPINE-SISTERS AREA (20)

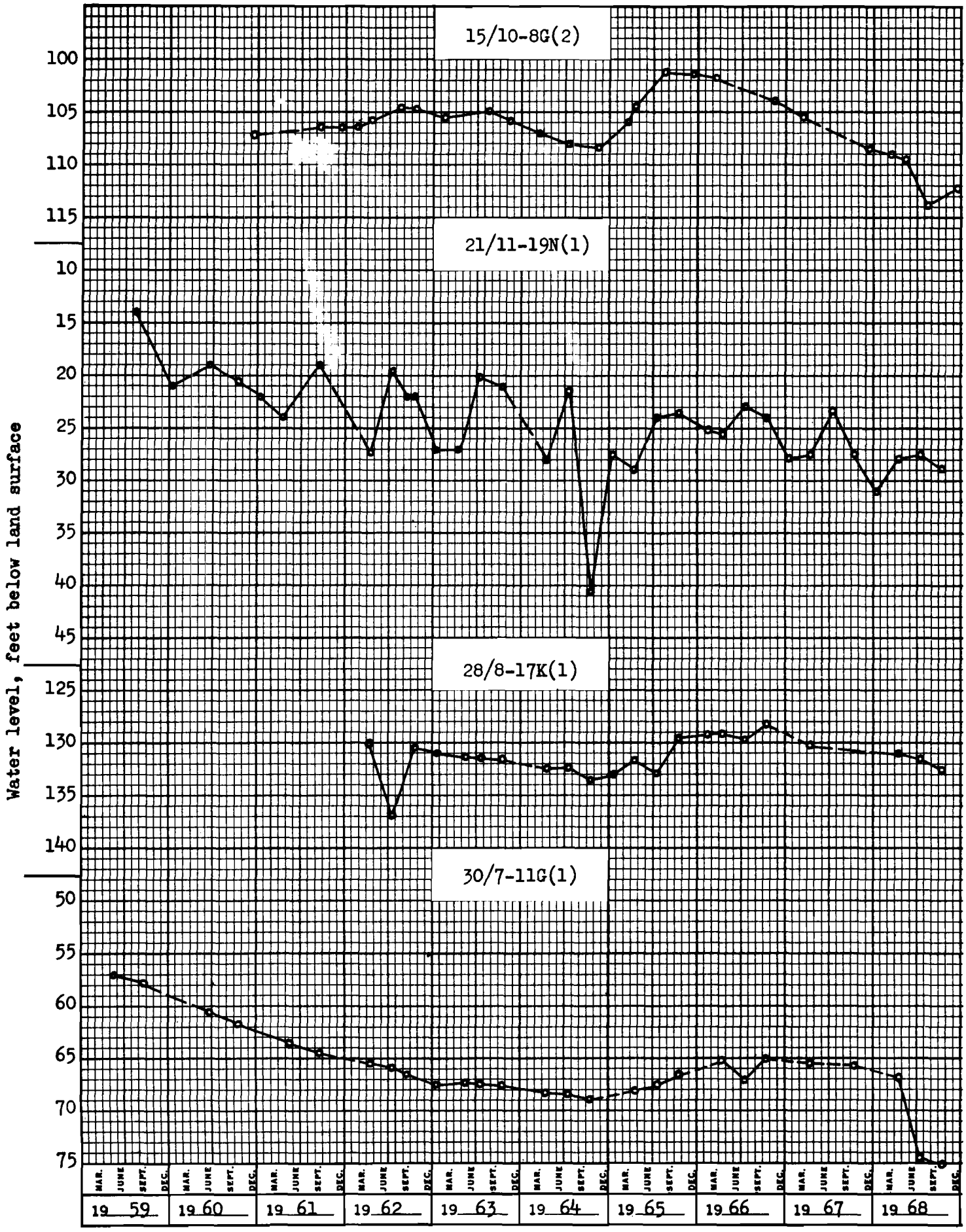
The eastern slope of the Cascade Mountains contains many ground-water reservoirs. The most permeable of these are generally associated with the younger volcanic rocks and associated cinder deposits. As the demand for additional water in this area increases, and as the availability of surface water supplies becomes so costly or unobtainable, communities, industries, and possibly agriculture will turn to the development of ground water supplies. Large capacity wells can be obtained throughout large parts of the area.

Water levels in many of the wells in this area, which have been declining slowly during the period 1959-64, showed a marked reverse in trend in 1965 and are now rising. These changes are believed due to changes in ground-water recharge which is controlled by climatic conditions.

OBSERVATION WELLS

15/10-8G(2)	(Ross Hammond) is a 228-foot drilled well in volcanic rock located near Sisters.
21/11-19N(1)	(Inez Kellems) is a 100-foot drilled well in sand located about 6 miles north of LaPine. Periodic water level measurements available from 1945 to date.
28/8-17K(1)	(Winema Lumber Company) is a 361-foot drilled well in lava located about 7 miles south of Chemult.
30/7-11G(1)	(Crown Zellerbach Corp.) is a 123-foot drilled well in lava located about 18 miles SW of Chemult near Klamath Marsh. Periodic water level measurements available from 1954 to date.

CHEMULT-LAPINE-SISTERS AREA (20)



PRINEVILLE AREA (21)

The Prineville area includes the Ochoco Creek and Crooked River Valleys in and around the City of Prineville. Ground water occurs at shallow depth in the sandy alluvial deposits and from a single sand and gravel stratum that lies at the base of the alluvial deposits. The shallow ground water reservoir contains unconfined ground water. Wells in these deposits usually provide yields that are less than 20 gallons per minute.

The thin sand and gravel stratum lying at the base of the alluvial deposits contains confined ground water that at places has an artesian head of from 70 to 80 feet above land surface. At Prineville, wells have been constructed in this confined ground water reservoir with yields in excess of 500 gallons per minute.

Recharge to the confined ground water reservoir is believed to come from leakage in irrigation canals and irrigation in the area north and northwest of Prineville. (Between 1957 and 1960 some decline of water levels was noted in the artesian wells. During the past five years, some recovery has taken place.)

OBSERVATION WELLS

14/15-15Q(1) (L. H. McPhetridge) is a 210-foot artesian well drilled in sand and gravel located about 4 miles NW of Prineville. Periodic water level measurements available from 1945 to date.

14/16-19H(1) (Leslie Clausen) is a 47-foot drilled well in sand located about 2 miles NW of Prineville. Periodic water level measurements available from 1944 and from 1947 to date.

14/16-32N(1) (E. E. Wagoner) is a 160-foot drilled well in sand and gravel located within Prineville. Periodic water level measurements available from 1944 to date.

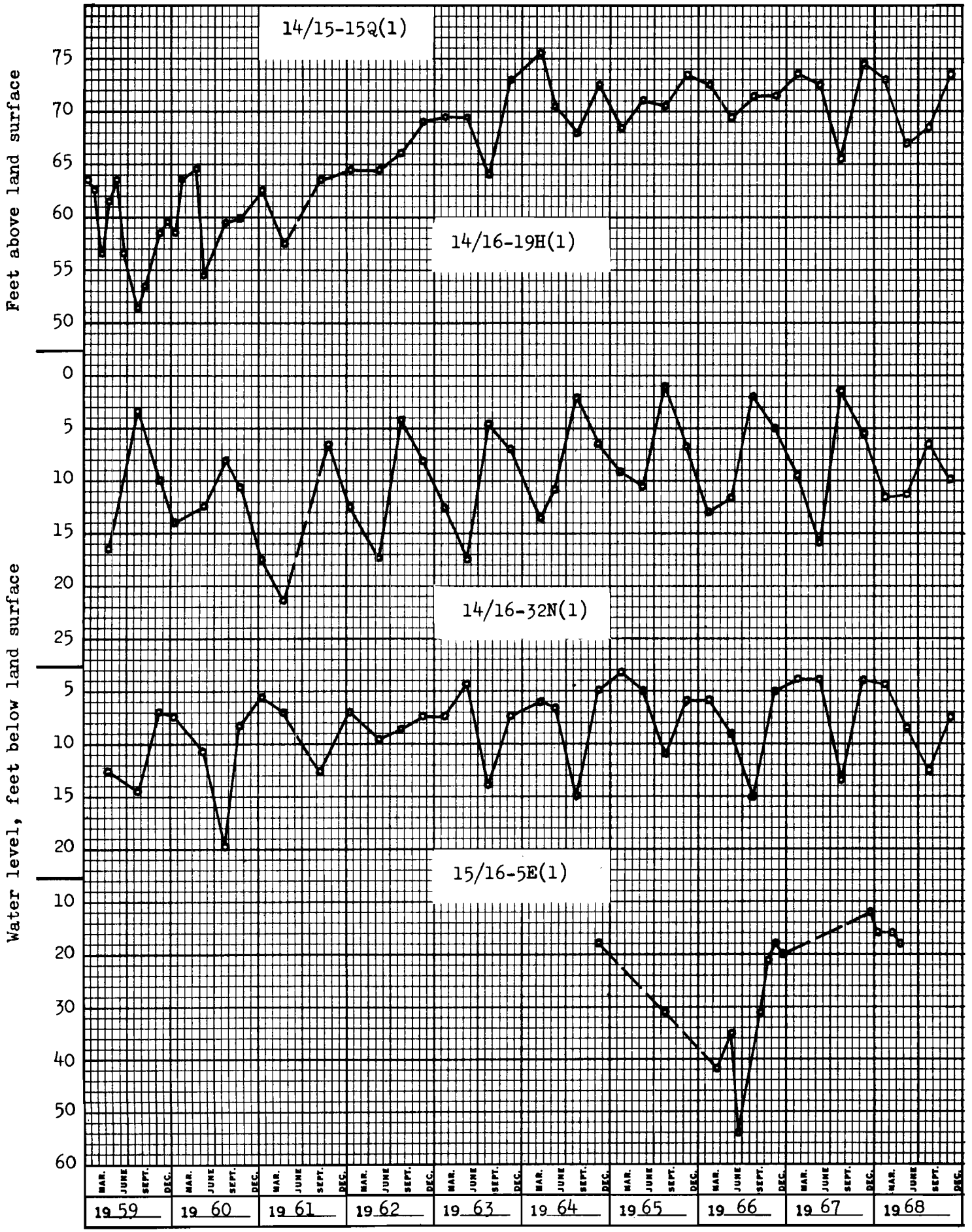
15/16-5E(1) (Pacific Power and Light Company) is a 252-foot drilled well in sand and gravel located within Prineville.

15/16-6A(1) (Dorn Brothers, formerly Gerow) Periodic water level measurements available from 1944 to 1965. Measurements discontinued; well has been temporarily abandoned.

REFERENCES

Robinson, J. W., and Price, Don, 1963, Ground water in the Prineville Area, Crook County, Oregon: U. S. Geological Survey Water Supply Paper 1619-P.

PRINEVILLE AREA (21)



MEDFORD AREA (22)

The Medford area, like other parts of southwestern Oregon, is noted for its lack of permeable ground-water reservoirs. Most wells produce adequate domestic or small group domestic supplies. The development of large ground-water supplies in this area for irrigation or industrial purposes is not likely. Thin fine grained deposits of sand and gravel adjacent to Bear Creek are very subject to pollution and offers meager domestic water supplies.

OBSERVATION WELLS

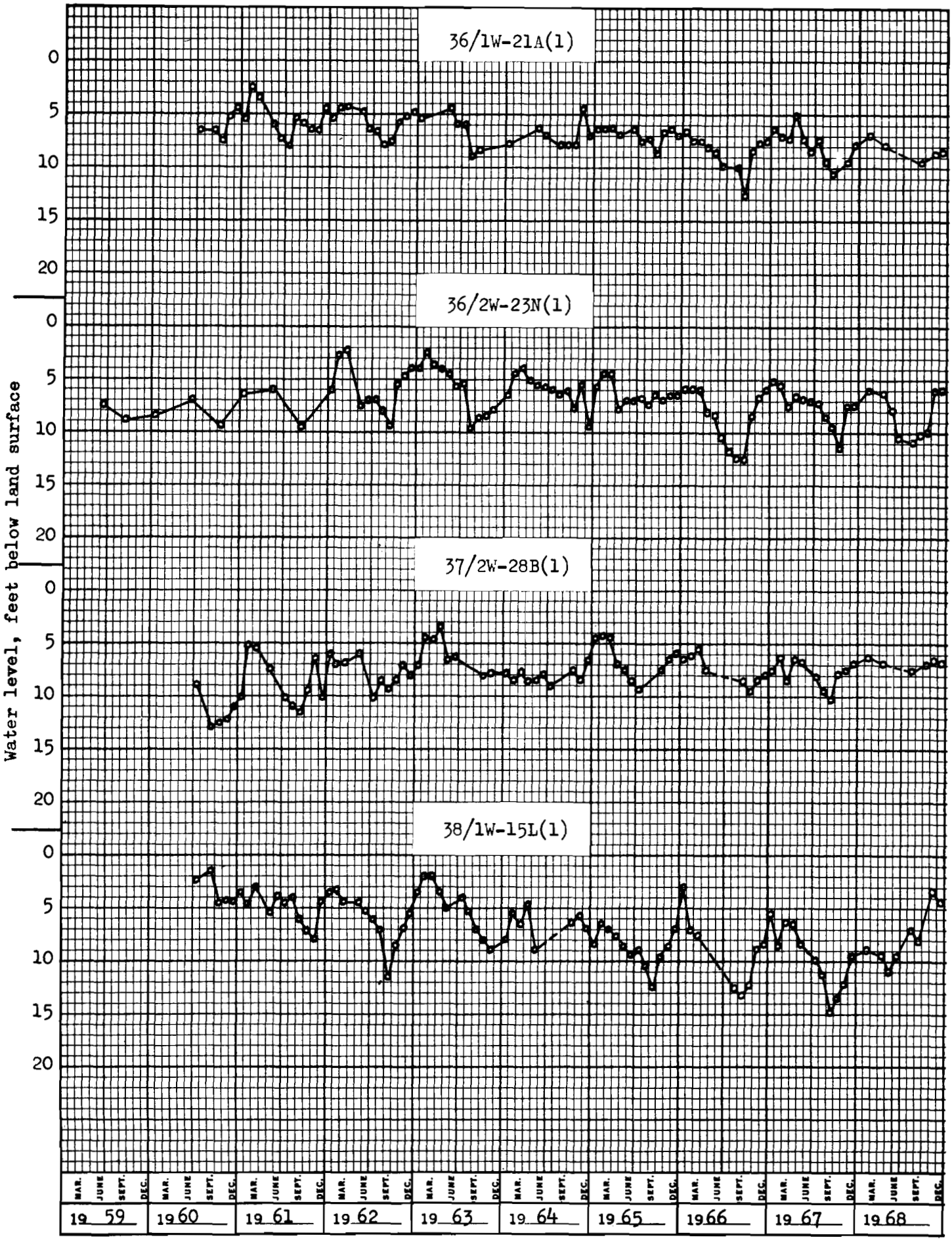
36/1W-21A(1) (Bud Hoover) is a 95-foot drilled well in shale located about 7 miles NE of Medford near White City.

36/2W-23N(1) (U.S. G. S.) is a 110-foot drilled well in sand & gravel located about 3 miles west of White City.

37/2W-28B(1) (Southern Oregon Experimental Station) is a 145-foot drilled well in sedimentary rock located about 2 miles NE of Jacksonville.

38/1W-15L(1) (City of Phoenix) is a 41-foot drilled well in sedimentary rock located in Phoenix.

MEDFORD AREA (22)



GRANTS PASS AREA (23)

The Grants Pass area of southwestern Oregon, is also noted for the lack of permeable ground-water reservoirs. Most wells produce adequate domestic supplies or small group domestic supplies. The development of large ground-water supplies in this area for irrigation or industrial purposes is not likely. Mountain building forces of the Siskiyou Mountain range has squeezed and altered the water bearing characteristic of many rock units in Southwest Oregon.

OBSERVATION WELLS

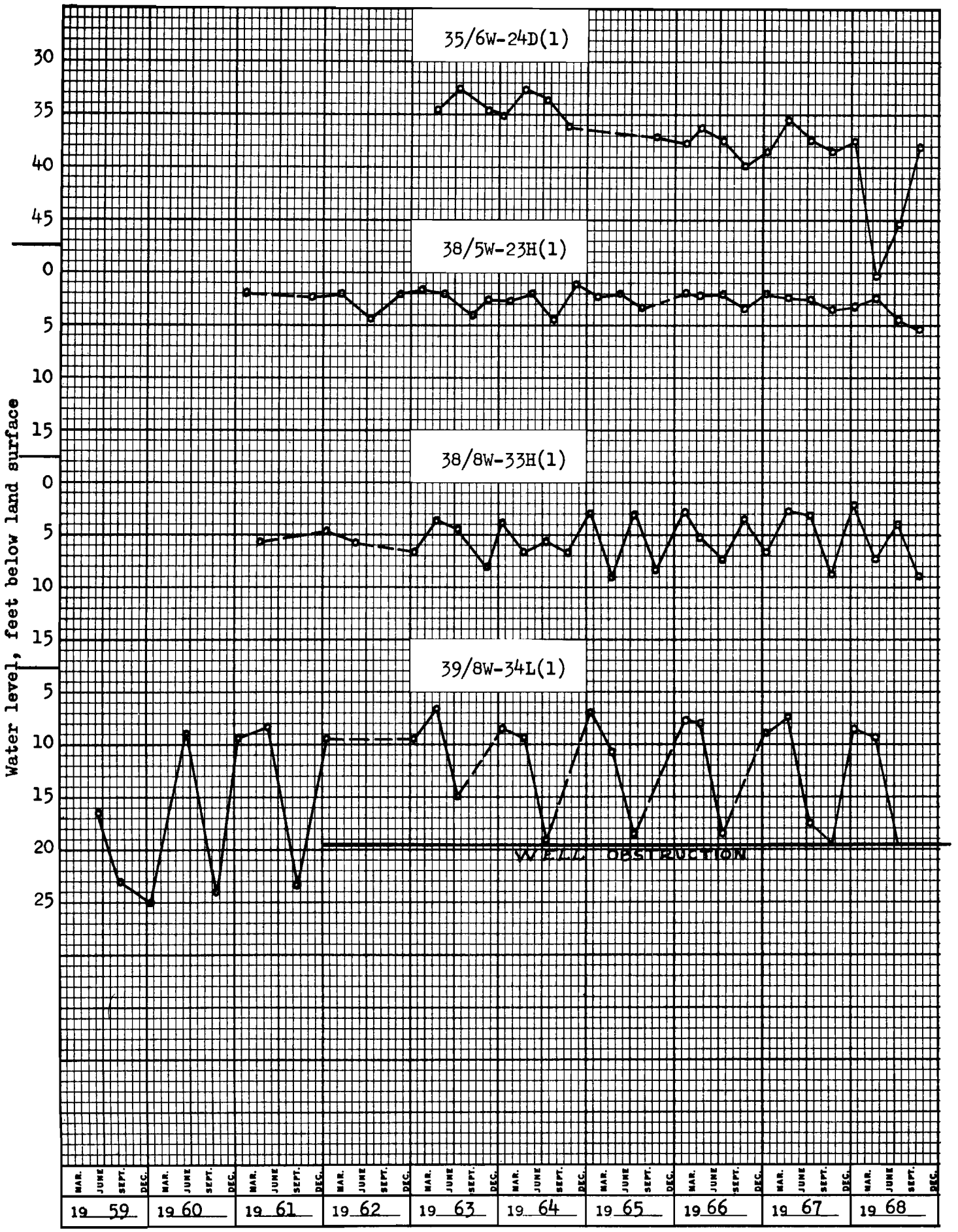
35/6W-24D(1) (Oregon State Highway Department) is a 123-foot drilled well in granite located about 5 miles NW of Grants Pass.

38/5W-23H(1) (John Katzenbach) is a 62-foot drilled well in gravel located about 2 miles SW of Provolt.

38/8W-33H(1) (J. R. Smith) is a 29-foot drilled well in sand & gravel located about 2 miles north of Kerby.

39/8W-34L(1) (U. S. G. S.) is a 119-foot drilled well in sand & gravel located about 3 miles SE of Cave Junction. Periodic water level measurements available from 1952 to date.

GRANTS PASS AREA (23)



COOS BAY AREA (24) - BANDON

The sand dune area lying along the coast north of Coos Bay contains the most productive ground water reservoirs in the entire coastal area. The dune sands which exceed several hundred feet in thickness, absorb large amounts of the heavy precipitation which occurs along the coast. It is estimated that the sand dunes in this area are capable of sustaining a yield of over 2,000,000 gallons per day per square mile. Salt water encroachment is a threat in areas of excessive development.

To date, only a small part of the ground water supply in this area has been developed and put to use.

OBSERVATION WELLS

OK 27/13W-27C(1) (City of Coquille) is a 150-foot drilled well in sandstone located about 3 miles NW of Coquille.

24/13W-33G(1) (Coos Bay-North Bend Water Board, formerly P.P. & L.) is a 20 foot jetted well in sand located about 2 miles north of North Bend. Periodic water level measurements available from 1957 to date.

23/13W-34G(1) (Pacific Power & Light Company) Periodic water level measurements available from 1957 to 1967. Measurements discontinued; well has been abandoned.

24/13W-10L(1) (Pacific Power & Light Company) is a 505—foot drilled well in sand located about 6 miles north of North Bend. Periodic water level measurements available from 1957 to date.

24/13W-28P(1) (Pacific Power & Light Company) is a 179-foot drilled well in sand located about 5 miles NW of North Bend. Periodic water level measurements available from 1957 to date.

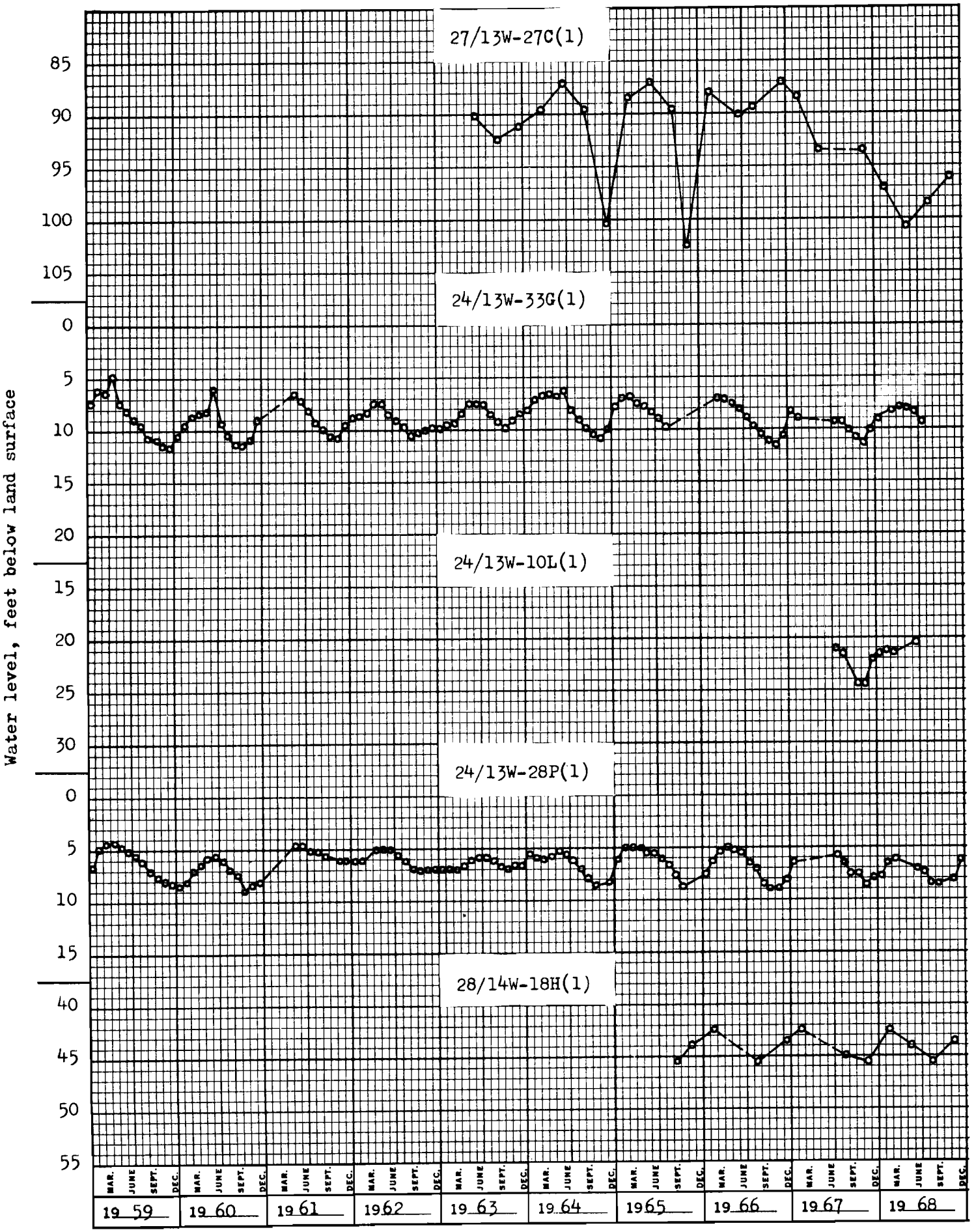
28/14W-18H(1) (Bullards Beach State Park) is a 75-foot drilled well in sand located about 1½ miles north of Bandon.

25/13W-4M(1) (Pacific Power and Light Company) Periodic water level measurements available from 1956 to 1967. Measurements discontinued; well has been abandoned.

REFERENCES

Brown, S. G., and Newcomb, R. C., 1963, Ground water resources of the coastal sand dune area north of Coos Bay, Oregon: U. S. Geological Survey Water Supply Paper 1619-D.

COOS BAY AREA (24)



UMPQUA RIVER VALLEY (25)

The Umpqua River Valley is underlain by relatively impermeable rock formations composed of sandstone and shales. Wells in this area generally yield only small supplies of water. The development of large ground water supplies for irrigation or industrial purposes in this area is unlikely. Water quality often shows excessive amounts of iron in deep drilled wells.

OBSERVATION WELLS

21/4W-19R(1) (Douglas County Parks Department) is a 110-foot drilled well in sedimentary rock located in Curtin.

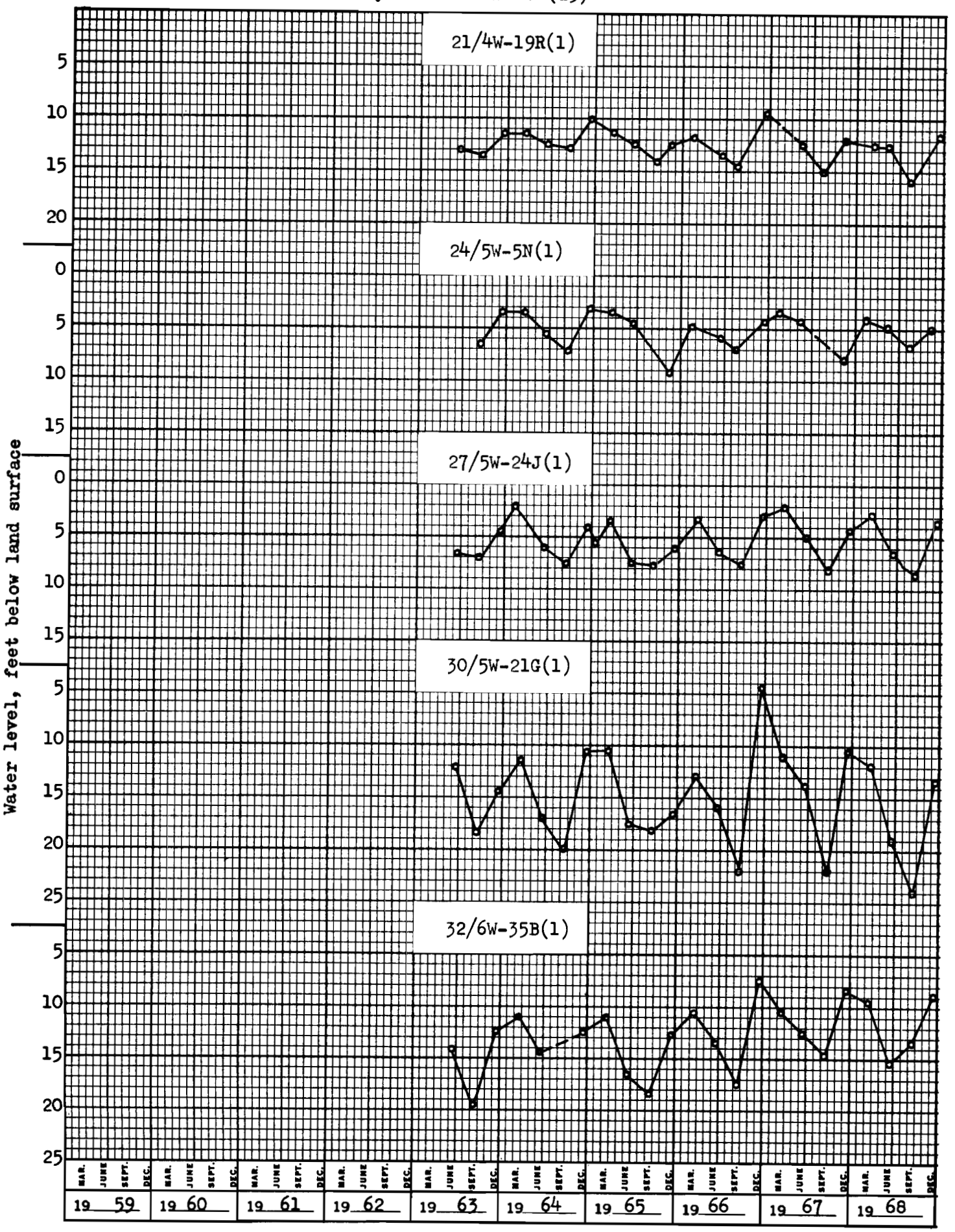
24/5W-5N(1) (Rex Tollefson) is a 80-foot drilled well in shale located about 6 miles north of Oakland.

27/5W-24J(1) (Douglas County Parks Department) is a 116-foot drilled well in sedimentary rock located about 6 miles east of Roseburg.

30/5W-21G(1) (Douglas County Parks Department) is a 90-foot drilled well in marine sediments located about one mile north of Canyonville.

32/6W-35B(1) (George H. Wells) is a 100-foot drilled well in sand and gravel located about 2 miles SE of Glendale.

UMPQUA RIVER VALLEY (25)



WILLAMETTE BASIN - LANE COUNTY (26)

The Willamette River Valley receives large quantities of water available for ground-water recharge. The rapidly varing character and aerial extend of the various geologic units causes marked differences in recharge and the availability of ground water. One of the major differences is the contrast between the lava rocks of the Cascade Mountains and the marine sediments of the Coast Range Mountains. The runoff characteristics of these two areas greatly affect ground water recharge. The Cascade Mountains are in large part composed of young volcanic rocks, while large areas of the Coast Range are composed of marine sedimentary rock and older volcanic rocks. The swift mountain streams flowing off the volcanic terrane of the Cascade Range carry coarse alluvial sediments that have been deposited in the alluvial fans along the eastern margin of the Willamette Valley. Slower moving streams flowing off the softer marine sediments and weathered volcanic rocks of the Coast Range deposited relatively fine-grained deposts of clay, silt and sand along the western margin of the Valley. (Continued on Page 90.)

OBSERVATION WELLS

16/2W-34P(1) (M. A. Nadeau) is a 73-foot drilled well in sand & gravel located about one mile south of Mohawk.

16/3W-32G(1) (Leo Sidwell) is a 39-foot drilled well in sand & gravel located about ½ mile west of Coburg. Periodic water level measurements available from 1928-1930, 1935-1936 and from 1938 to date.

17/2W-32C(1) (Weyerhaeuser Timber Company) is a 175-foot drilled well in sand & gravel located near Springfield.

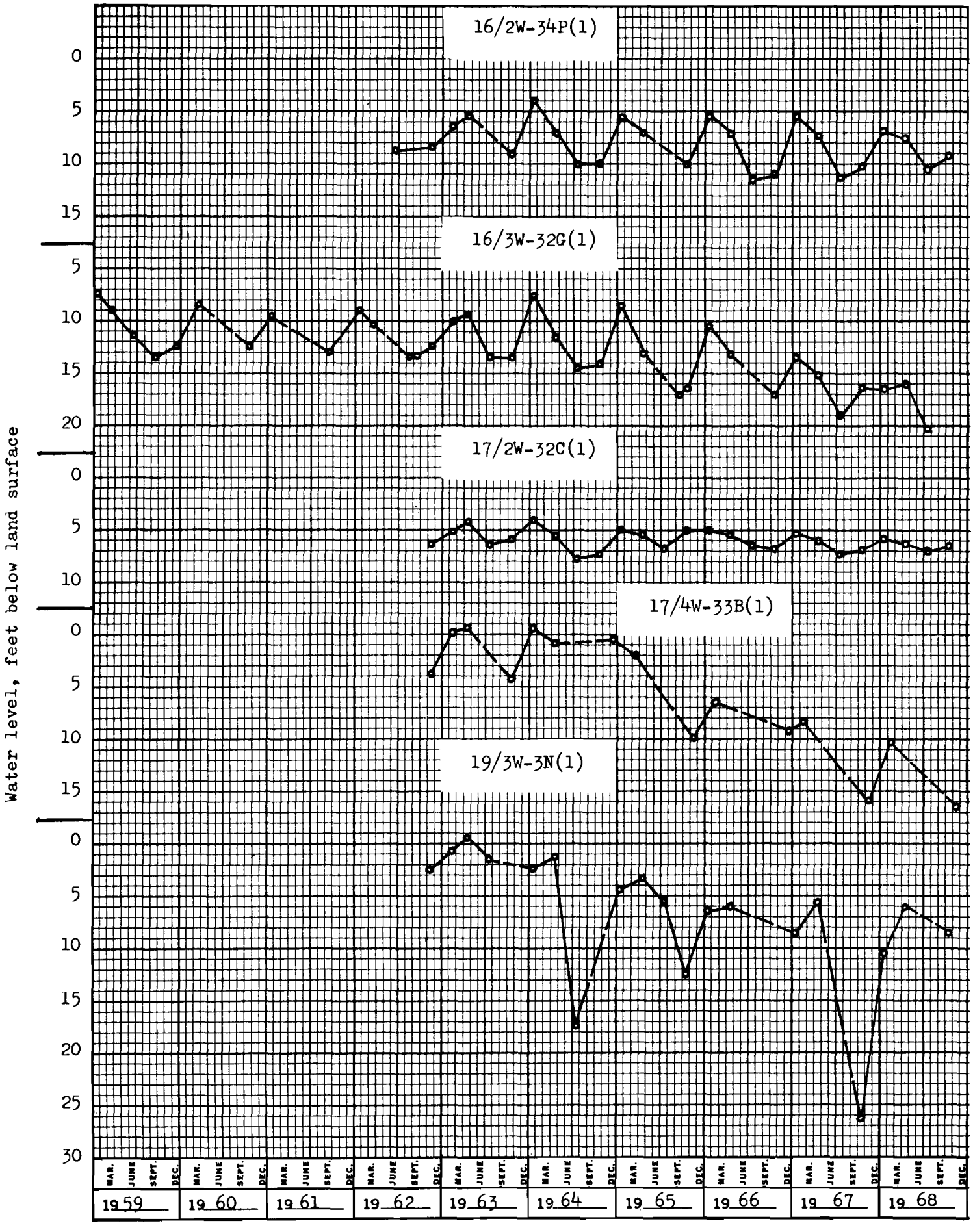
17/4W-33B(1) (Westlawn Memorial Cemetery) is a 150-foot drilled well in sand & gravel located about 3 miles west of Eugene.

19/3W-3N(1) (Oregon State Game Commission) is a 200-foot drilled well in sandstone located about 4 miles NW of Creswell.

REFERENCES

Piper, Arthur, 1942, Ground water resources of the Willamette Valley, Oregon: U. S. Geological Survey Water Supply Paper 890.

WILLAMETTE BASIN (26) - LANE COUNTY



The difference in character of the alluvial sediments from one side of the valley to the other accounts for the great difference in the availability of ground water in these two areas. Productive ground water reservoirs are common along the eastern half of the valley but are missing along most of the western side of the valley.

In Lane County, the productive ground water reservoirs are chiefly related to the alluvial deposits of the McKenzie and Willamette Rivers. Older marine and volcanic rocks underlying the alluvial deposits are generally fine-grained and are capable of yielding only small supplies of ground water. The permeable character and shallow occurrence of the alluvial deposits creates a serious threat of ground water pollution. Surface sources of pollution can be easily transmitted to shallow ground water bodies.

In Linn County, the productive ground water reservoirs are similar to those in Lane County being chiefly the alluvial deposits along the Willamette and Santiam Rivers. The older formations underlying the alluvial deposits are generally of low permeability and not capable of yielding large supplies of ground water.

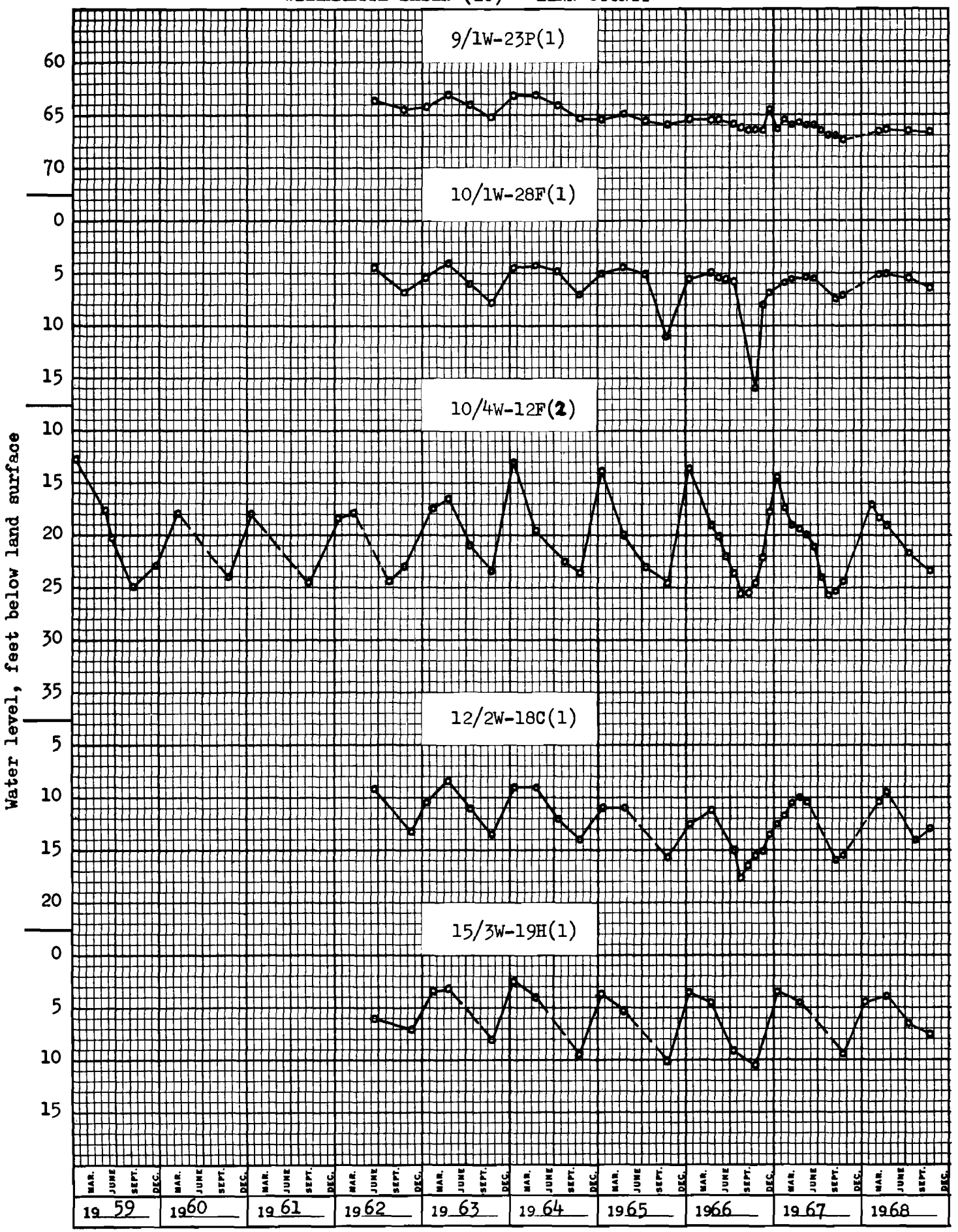
OBSERVATION WELLS

9/1W-23P(1)	(Charles Hecht) is a 93-foot drilled well in sedimentary rock located about 2 miles SE of Stayton.
10/1W-28F(1)	(Grant Farris) is a 172-foot drilled well in blue shale located about 3 miles SE of Scio.
10/4W-12F(2)	(Henry Hoefer) is a 32-foot drilled well in gravel located about 7 miles north of Albany. Periodic water level measurements available from 1928-1930, 1935-1936, and from 1938 to date.
12/2W-18C(1)	(Henry DeManette) is a 175-foot drilled well in sedimentary rock located about 4 miles west of Lebanon.
15/3W-19H(1)	(Edgar B. Grimes) is a 98-foot drilled well in sand and gravel located about 4 miles SE of Harrisburg.

REFERENCES

Piper, Arthur, 1942, Ground water resources of the Willamette Valley, Oregon: U. S. Geological Survey Water Supply Paper 890.

WILLAMETTE BASIN (26) - LINN COUNTY



WILLAMETTE BASIN - BENTON COUNTY (26)

Most of the upland areas in Benton County are underlain with volcanic rocks or marine sedimentary rocks. These formations have low permeability and are generally capable of yielding only small supplies of ground water. The older alluvium along the western margin of the Willamette Valley, which was derived from the Coast Range, is generally fine-grained and capable of yielding only small supplies of ground water. The most productive ground water reservoir is the alluvial gravels underlying the flood plain of the Willamette River along the eastern edge of the county. Many of the shallow wells in the gravel alluvium have been developed to yields ranging from 500 to 1,000 gallons per minute. The extreme permeability of these materials and their near surface occurrence makes this source of ground water subject to pollution problems.

OBSERVATION WELLS

10/3W-32E(1) (D. E. Nebergall) is a 90-foot drilled well in sand located about one mile NE of Albany.

11/5W-1P(1) (Edward G. Skoubo) is a 89-foot drilled well in sand rock located about 4 miles NE of Corvallis.

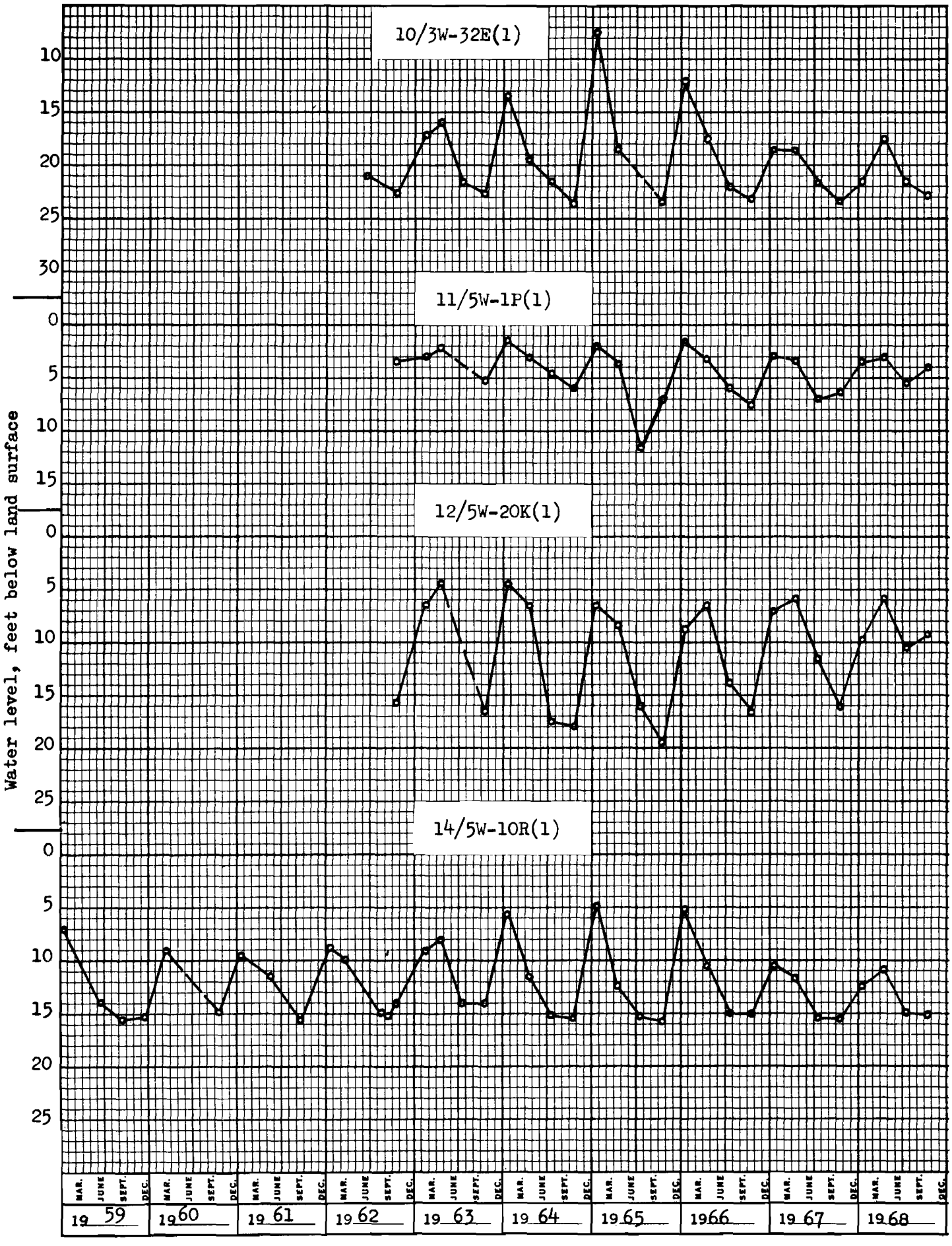
12/5W-20K(1) (C. A. McDonald) is a 100-foot drilled well in sand and gravel located about 3 miles SW of Corvallis.

14/5W-10R(1) (Chris Lindseth) is a 19-foot driven well in silt located about 4 miles north of Monroe. Periodic water level measurements available from 1929-1930, 1935-1936, and from 1938 to date.

REFERENCES

Piper, Arthur, 1942, Ground water resources of the Willamette Valley, Oregon: U. S. Geological Survey Water Supply Paper 890.

WILLAMETTE VALLEY (26) - BENTON COUNTY



WILLAMETTE BASIN - POLK COUNTY (26)

The most productive ground water reservoirs in Polk County are the sand and gravel deposits underlying the flood plain of the Willamette River. At places, these deposits are capable of yielding more than 1,000 gallons per minute to properly constructed wells. A high iron content of the ground water in some of these alluvial deposits may restrict the use of this supply.

Most of the other rock units in Polk County, with the exception of the basaltic lava flows underlying the Eola Hills are fine-grained and are generally capable of yielding only small supplies of ground water. Deep wells drilled into the marine sedimentary rocks which underlie a large part of the county often encounter salt water. The lavas underlying the eastern slope of the Eola Hills are generally capable of yielding small to moderate supplies of water.

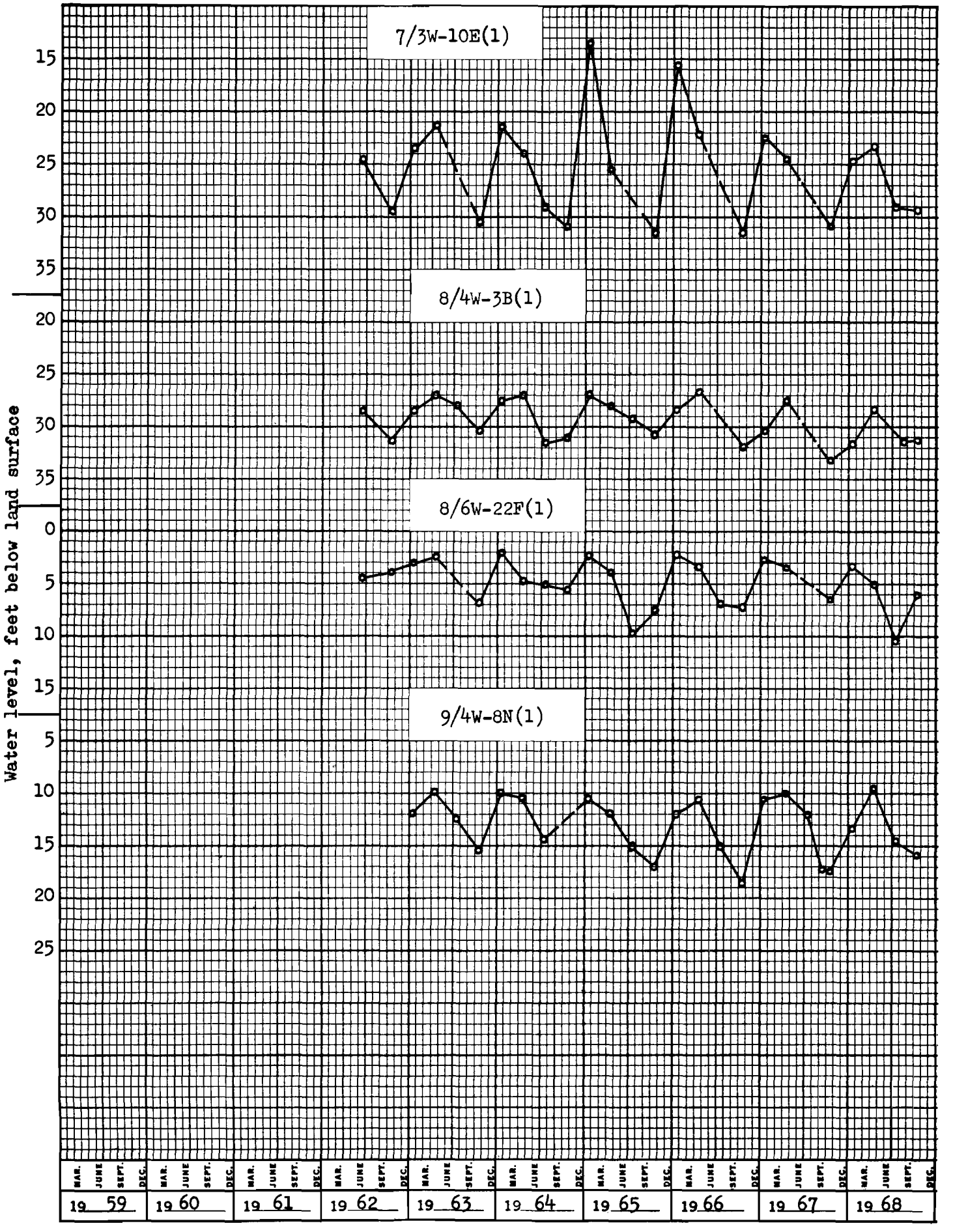
OBSERVATION WELLS

7/3W-10E(1)	(Leland P. Brandt) is a 150-foot drilled well in sand and gravel located about 3 miles north of Salem.
8/4W-3B(1)	(Theodore C. Muller) is a 60-foot drilled well in gravel located about 4 miles SE of Rickreall.
8/6W-22F(1)	(Edward Bakke) is a 79-foot drilled well in marine sediments located about one mile east of Falls City.
9/4W-8N(1)	(D. W. Christianson) is a 120-foot drilled well in sand and gravel located about 8 miles south of Independence.

REFERENCES

Price, Don, and Johnson, Nyra A., 1965, Selected Ground Water Data in the Eola-Amity Hills Area, Northern Willamette Valley, Oregon: State Engineer Ground Water Report No. 7.

WILLAMETTE BASIN (26) - POLK COUNTY



WILLAMETTE BASIN - MARION COUNTY (26)

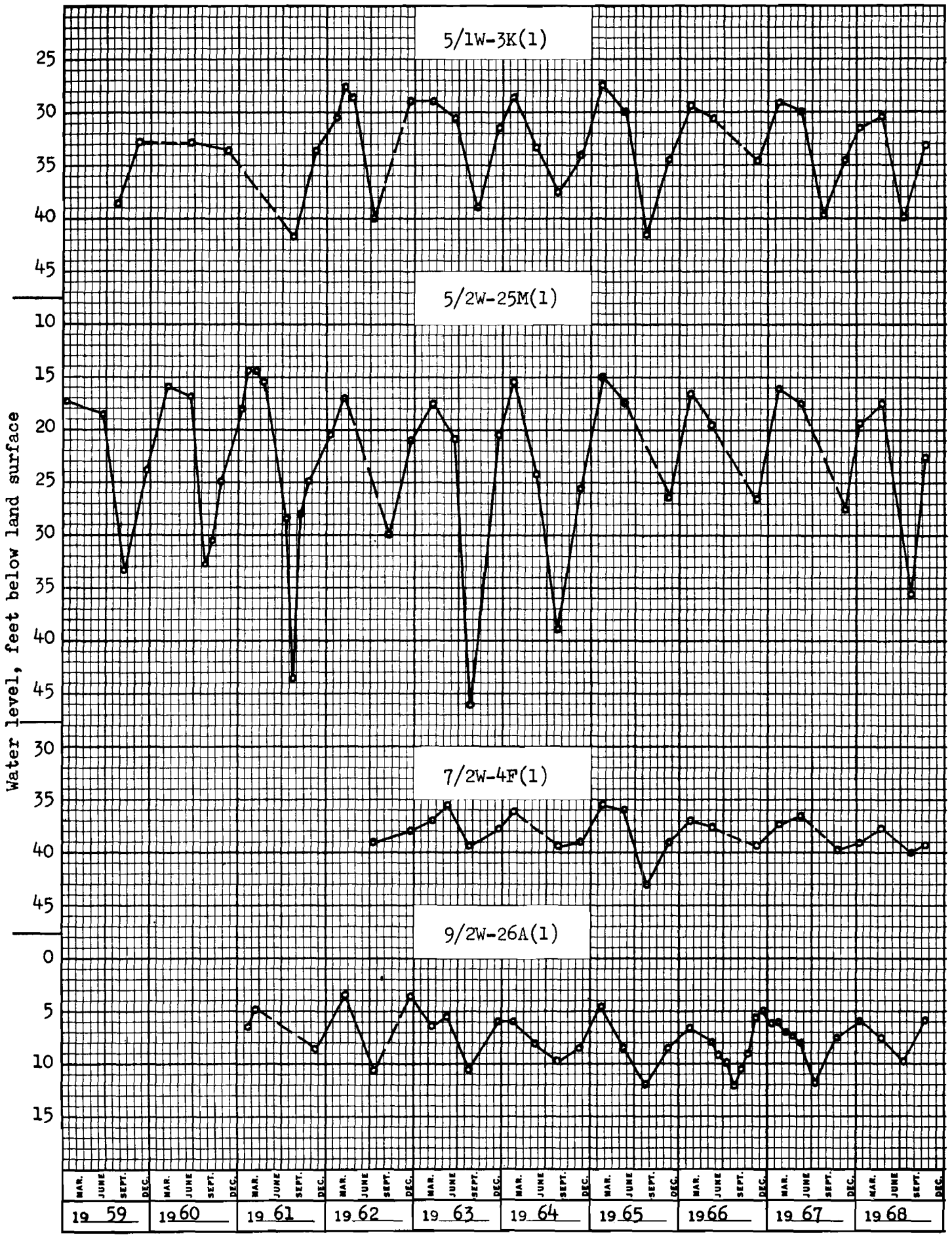
The most productive ground water reservoirs in Marion County are the alluvial gravels underlying the flood plain of the Willamette River and the older gravel strata underlying the French Prairie area.

The Geological Survey investigation has found that recharge has been more than ample to replace the annual discharge from the ground water reservoir underlying the French Prairie area. During 1960, the pumpage was in the order of 20,000 acre feet, which represented only about 8% of the total volume naturally discharged from the area each year. The total natural discharge was estimated to have been 258,000 acre feet. They concluded that an additional lowering of the water table by 5 feet each irrigation season would result in a more efficient utilization of the ground water reservoir by providing additional storage space to hold water that is now generally rejected during the spring months. This would increase the total available ground water supply in this area to as much as 388,000 acre feet per year. As the amount of water required to irrigate the area is estimated to be about 100,000 acre feet, there appears to be an ample ground water supply available to irrigate the entire area without fear of an overdraft on the ground water reservoir.

OBSERVATION WELLS

5/1W-3K(1)	(Manton Carl, formerly Ramlo) is a 102-foot drilled well in gravel located about one mile south of Hubbard.
5/2W-25M(1)	(Sam Brown) is a 252-foot drilled well in sand and gravel located about one mile east of Gervais. Periodic water level measurements available from 1929-1930, 1935-1936, and from 1938 to date.
7/2W-4F(1)	(P. W. Woelke) is a 165-foot drilled well in sand and gravel located about 4 miles NE of Salem.
9/2W-26A(1)	(Louis C. Scofield) is a 25-foot drilled well in gravel located about 3 miles south of West Stayton.

WILLAMETTE VALLEY (26) - MARION COUNTY



OBSERVATION WELLS

4/1W-23G(1) (Donald Olmstead) is a 57-foot dug well in silt and sand located about 3 miles SW of Aurora. Periodic water level measurements available from 1945 to date.

4/2W-22M(1) (Kirk Brothers) is a 117-foot drilled well in sand located about 3 miles east of St. Paul. Periodic water level measurements available from 1957 to date.

6/2W-18G(1) (E. A. Hillyer) is a 140-foot drilled well in sand and gravel located about 2 miles SW of Brooks. Periodic water level measurements available from 1957 to date.

8/3W-11N(1) (City of Salem) is a 270-foot drilled well in basalt located within Salem.

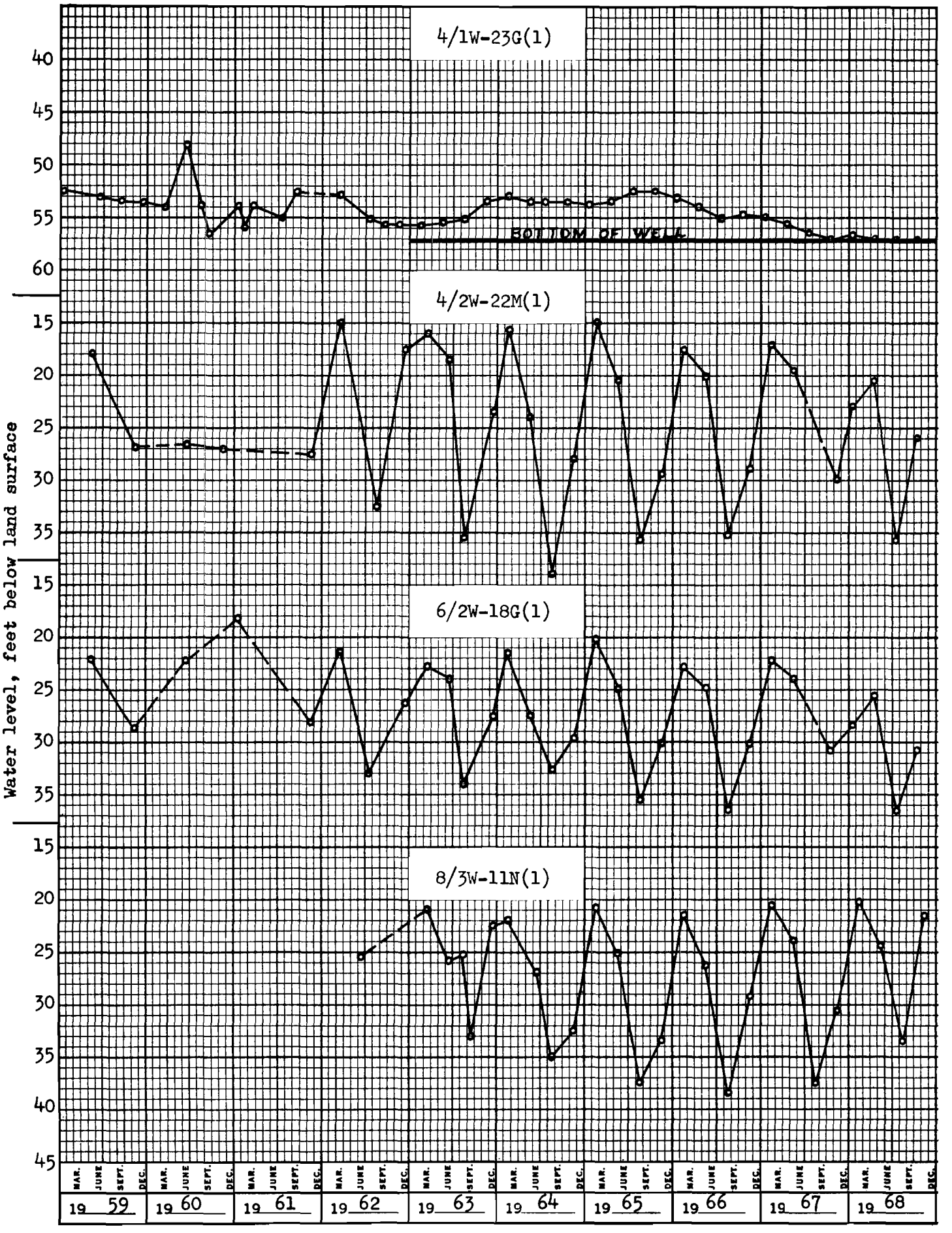
REFERENCES

Hampton, E. R., 1963, Records of wells, water levels, and chemical quality of ground water in the Molalla-Salem Slope area, Northern Willamette Valley, Oregon: State Engineer Ground Water Report No. 2.

Price, Don, 1961, Records of wells, water levels and chemical quality of ground water in the French Prairie-Mission Bottom area, Northern Willamette Valley, Oregon: State Engineer Ground Water Report No. 1

Price, Don, 1965, Ground water conditions and availability in the French Prairie area, Northern Willamette Valley, Oregon: U. S. Geological Survey open file report.

WILLAMETTE VALLEY (26) - MARION COUNTY



WILLAMETTE BASIN - YAMHILL COUNTY (26)

The most productive ground water reservoirs in Yamhill County are the alluvial sand and gravel deposits along the Willamette River. Some of these deposits have been developed to yields ranging from 500 to 800 gallons per minute. The alluvial deposits along the Yamhill River are thin and fine grained and are generally capable of furnishing only small supplies of ground water. The marine sedimentary rocks that underlie large parts of Yamhill County have low permeability and yield only small supplies of ground water. Some of the wells drilled into these marine rocks have encountered salt water.

OBSERVATION WELLS

3/2W-17A(1) (Mack Bennett) is a 200.5-foot drilled well in basalt located about 1 mile NE of Newberg.

4/3W-33K(1) (Clayton J. Trent) is a 220-foot drilled well in sand located about 4 miles south of Dayton.

5/4W-11D(1) (Norman J. Longhurst) is a 96-foot drilled well in black sand located about 3 miles east of Whiteson.

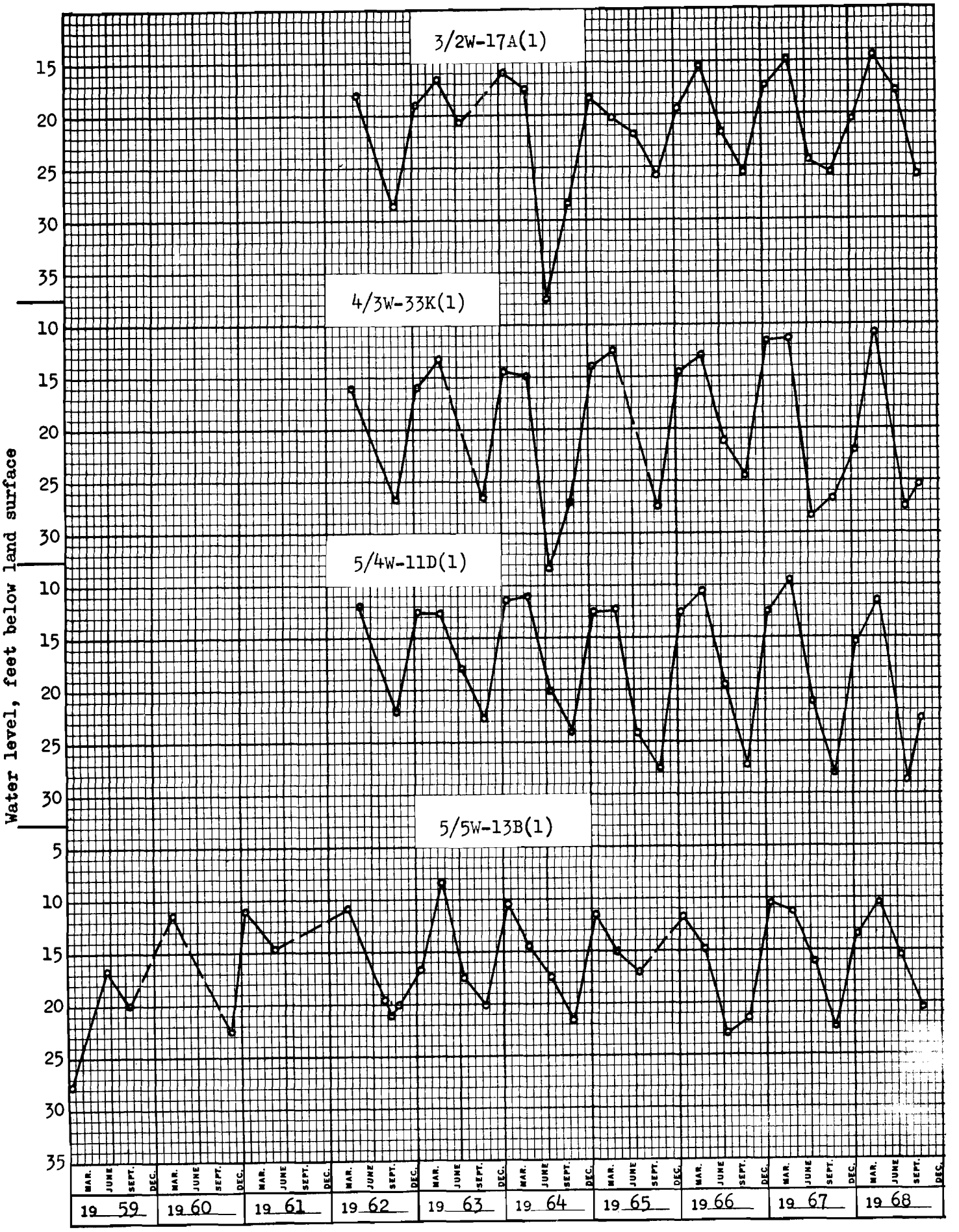
5/5W-13B(1) (George Fuller) is a 64-foot drilled well in sand and gravel located about 7 miles SW of McMinnville. Periodic water level measurements available from 1928-1930, 1935-1936 and from 1938 to date.

REFERENCES

Piper, Arthur, 1942, Ground water resources of the Willamette Valley, Oregon: U. S. Geological Survey Water Supply Paper 890.

Price, Don, and Johnson, Nyra A., 1965, Selected Ground Water Data in the Eola-Amity Hills Area, Northern Willamette Valley, Oregon: State Engineer Ground Water Report No. 7.

WILLAMETTE BASIN (26) - YAMHILL COUNTY



WILLAMETTE BASIN - CLACKAMAS COUNTY (26)

The Columbia River Basalt Formation is an important source of ground water in Clackamas County. It serves as a source of water in the Wilsonville, Lake Oswego, and Milwaukie areas. Water from weathered basalt formations is often high in dissolved iron and some areas of "red water" exist in the county. A clay mantle formed by the weathering of the basalt on many of the uplands tends to restrict recharge.

In the Canby-Aurora area, moderately large supplies of ground water have been developed in alluvial deposits.

OBSERVATION WELLS

2/2-15D(1)	(Byrum W. Morehouse) is a 347-foot drilled well in sand and gravel located near Gladstone.
2/4-4R(1)	(M. K. Smith) is a 400-foot drilled well in sand and gravel located about 2 miles east of Boring.
3/1W-10N(1)	(Charles Jenkins) is a 115-foot drilled well in Columbia River Basalt located about 2 miles north of Wilsonville. Periodic water level measurements available from 1951 to date.
3/1-34P(1)	(Frank Delforge) is a 218-foot drilled well in sand and gravel located about 1 mile east of Canby.

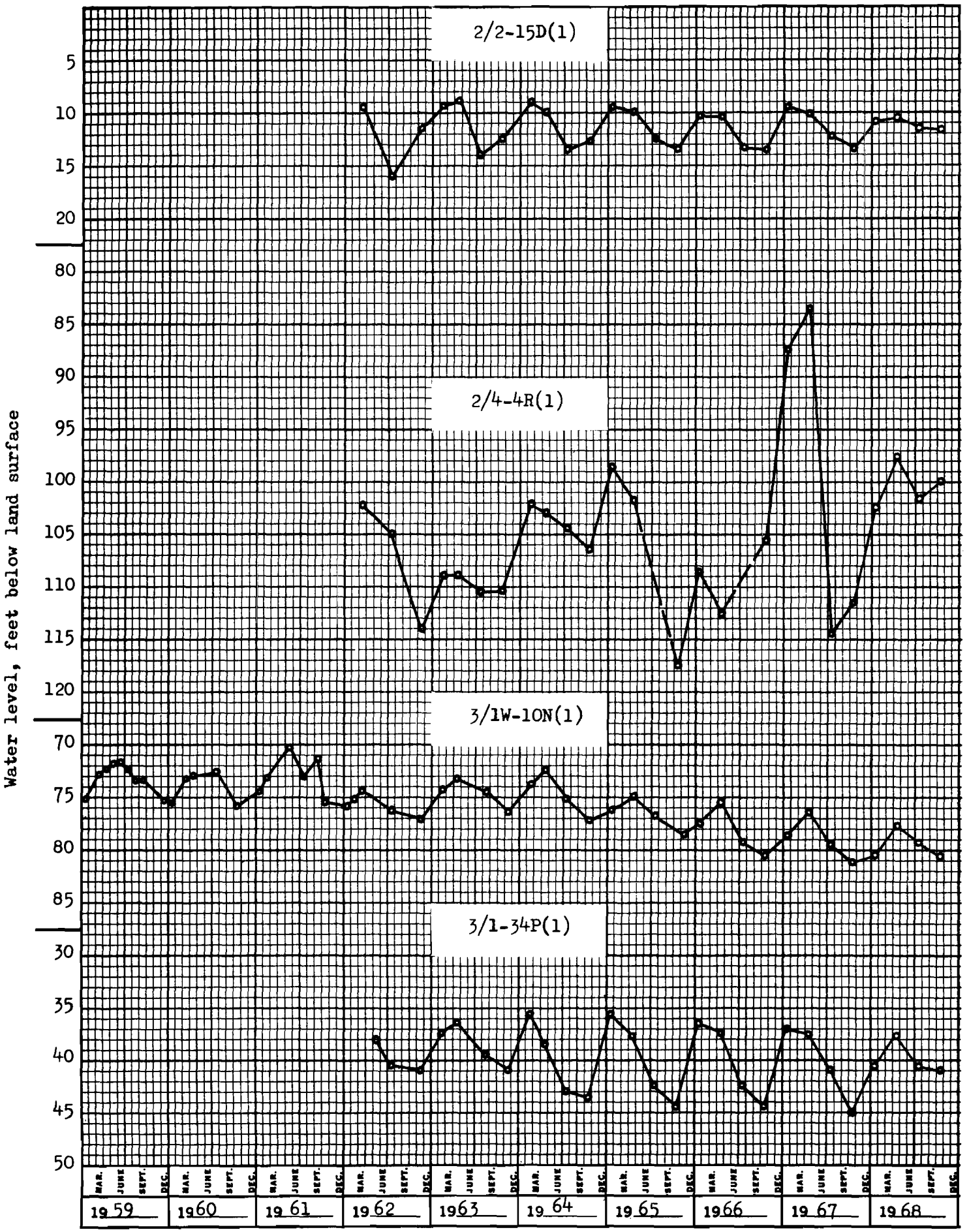
REFERENCES

Foxworthy, B. L., et al, 1964, Records of wells and springs, water levels and chemical quality of ground water in the East Portland area, Oregon: State Engineer Ground Water Report No. 3.

Hampton, E. R., 1963, Records of wells, water levels and chemical quality of ground water in the Molalla-Salem Slope area, Northern Willamette Valley, Oregon: State Engineer Ground Water Report No. 2.

Hogenson, G. M., and Foxworthy, B. L., 1965, Ground Water in the East Portland Area, Oregon: U. S. Geological Survey Water Supply Paper 1793.

WILLAMETTE BASIN (26) - CLACKAMAS COUNTY



TILLAMOOK AREA (27)

The Tillamook area includes the broad valley occupied by the Wilson, Trask, and Tillamook Rivers in and adjacent to the town of Tillamook. The present valley was formed by the gradual filling of Tillamook Bay with alluvial deposits. These deposits, which at places extend to depths of 150 feet or more, form the only productive ground water reservoir in the area. Some of the wells drilled into these deposits have been developed to yield as much as 600 gallons per minute.

The marine sedimentary rocks which underlie the alluvial deposits and form the surrounding hills have low permeability and are capable of yielding only small supplies of ground water.

The large amount of precipitation incident to the area fills the ground water reservoirs early in the winter and large amounts of the water available for recharge is rejected.

OBSERVATION WELLS

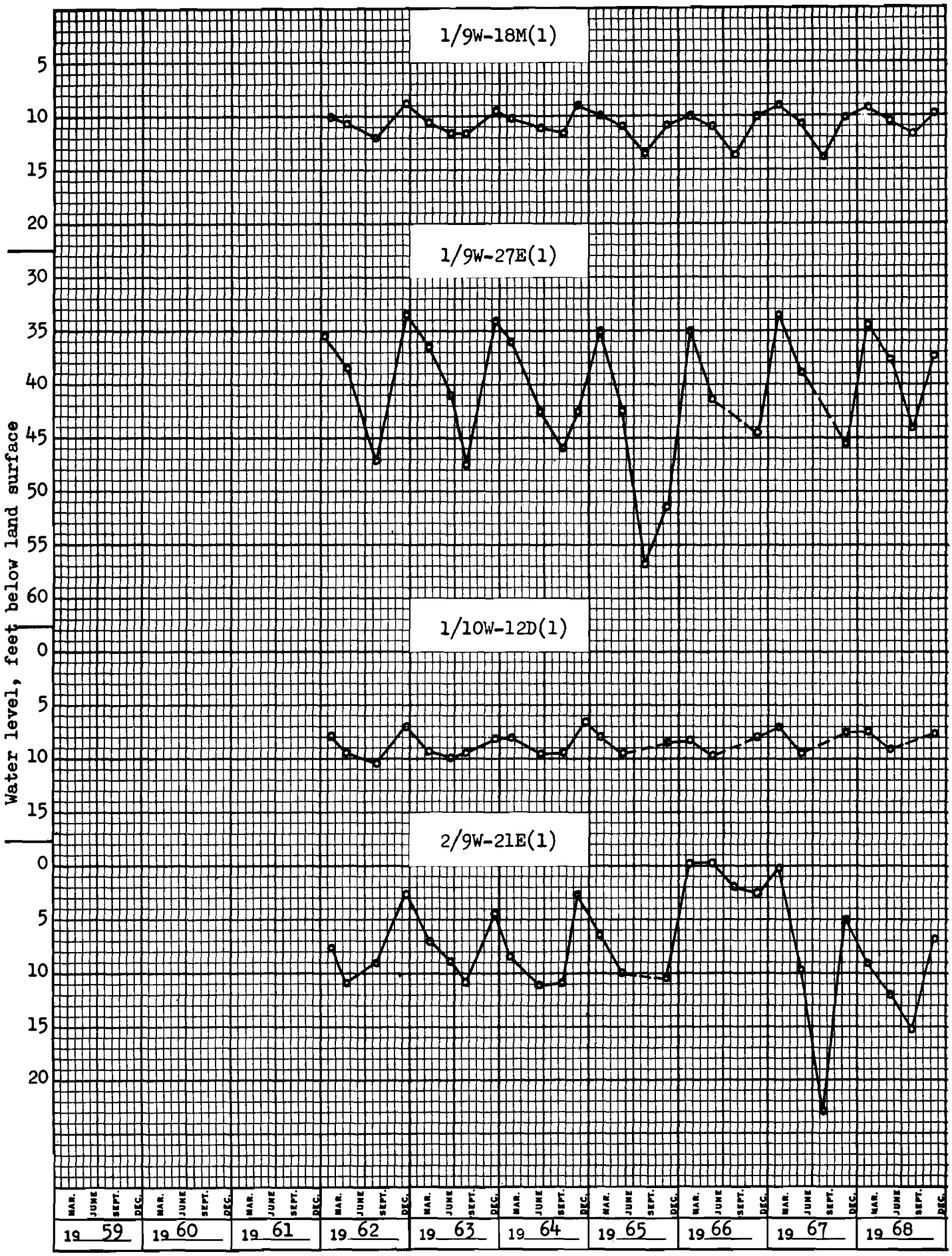
1/9W-18M(1) (Green Acres Motel) is a 187-foot drilled well in gravel located about 2 miles north of Tillamook.

1/9W-27E(1) (Virgil Chadwick) is a 197-foot drilled well in gravel located about 2½ miles east of Tillamook.

1/10-12D(1) (Leo & Robert Wassmer) is a 80-foot drilled well in gravel located about 3½ miles NW of Tillamook near Idaville.

2/9W-21E(1) (Vern Darby) is a 128-foot drilled well in gravel located about 7 miles SE of Tillamook.

TILLAMOOK AREA (27)



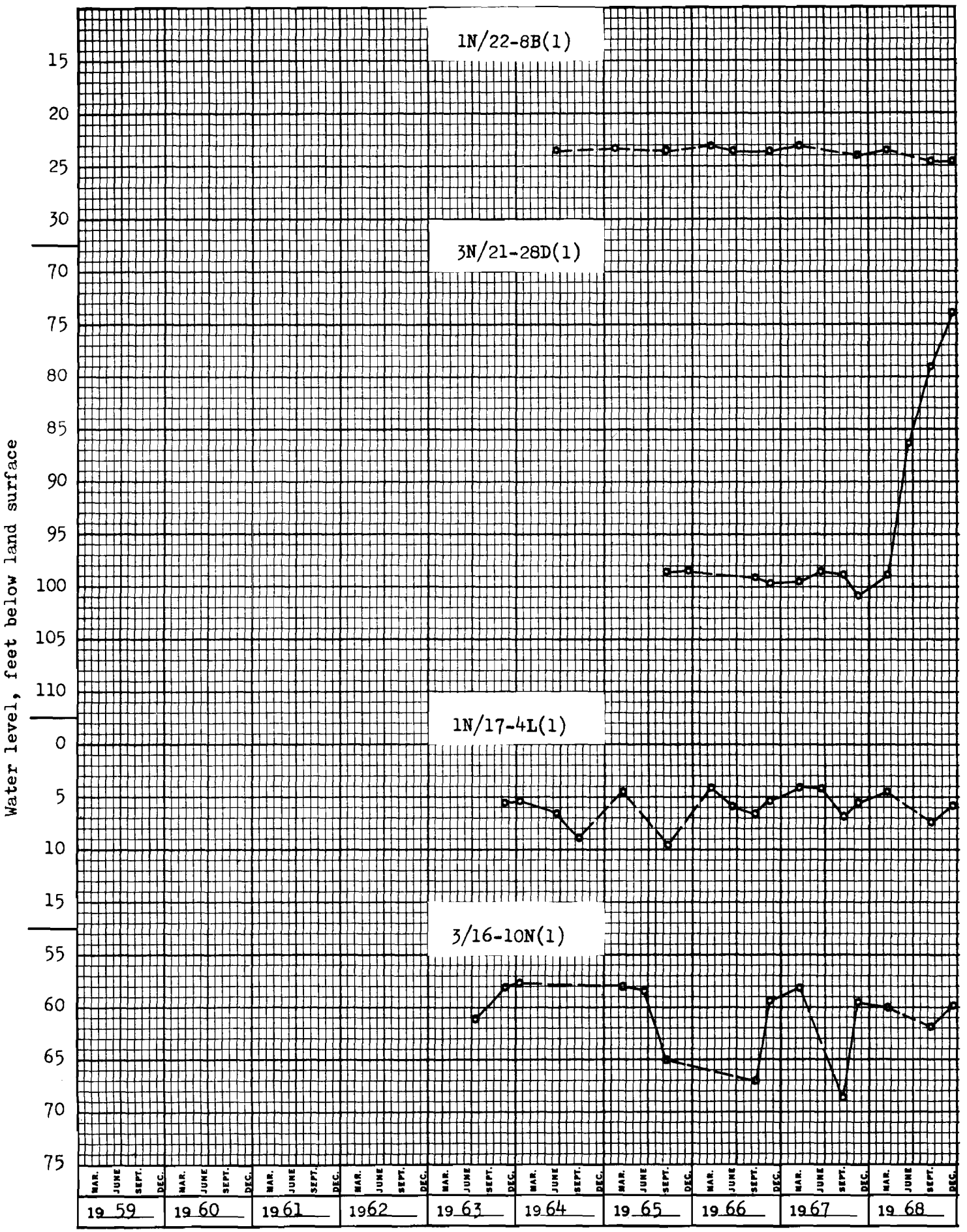
GILLIAM - SHERMAN COUNTY (28)

Much of the area in Gilliam and Sherman County is formed by the northward dipping basaltic plateaus known as the "Columbia Slope". Much of the area is made up of a thick sequence of basaltic lava flows. These units become increasingly thin toward the southern boundary of the area. Contact zones between flows are usually inflated and are capable of transmitting ground water in zones lying below the regional water table. Water levels often stand at considerable depths below land surface on the upland plateaus. The annual recharge occurs in the higher elevations to the south and moves down gradient toward the Columbia River. Artesian wells are not uncommon in the inclined basaltic lava rocks. Much of the surface of the basalts has been covered by a blanket of wind blown silt and loess deposits. Shallow domestic wells are often developed in perched water table areas in these deposits.

OBSERVATION WELLS

1N/22-8B(1)	(D. L. Lemon) is a 229-foot drilled well in basalt located about 10 miles SE of Arlington.
3N/21-28D(1)	(City of Arlington) is a 619-foot drilled well in basalt located within Arlington.
1N/17-4L(1)	(Phillip G. O'Meara) is a 712-foot drilled well in basalt located near Wasco.
3/16-10N(1)	(E. J. Hartley) is a 126-foot drilled well in basalt located about 4 miles south of Grass Valley.

GILLIAM - SHERMAN COUNTY (28)



LIST OF OBSERVATION WELLS

BAKER COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
7/39-3B(1)	L. H. Williams	1963-
7/39-20N(1)	City of Baker	1936-
7/39-28D(1)	Martha Traverso et al	1963-
7/40-33K(1)	Walter Colton	1964-
8/39-22F(1)	Baker County	1936- 1/
8/40-19D(1)	Baker County	1936- 1/
8/40-23A(1)	Baker County	1936-
8/41-14B(1)	Steward - Morrissey Inc.	1963-
8/46-15B(1)	Lewis Laird	1964-
9/39-2N(1)	Kermit Hansen	1949- 1/
9/40-1N(2)	Arlie Patton	1964
9/40-18Q(1)	Paul V. Hill	1963- 1/
13/37-17G(1)	Unity School District 30J	1964-

BENTON COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
10/3W-31B(1)	Springhill Country Club	1965-
10/3W-32E(1)	D. E. Nebergall	1962- 1/
10/4W-10N(1)	George Ambrosek	1965-
10/6W-21B(1)	John Maloney	1965-
11/4W-5P(1)	Oregon State University Farm	1965-
11/4W-5R(1)	Oregon State University Farm	1965-
11/4W-19L(1)	Oregon State University	1962-
11/5W-1P(1)	Edward C. Skoubo	1962- 1/
12/5W-8A(1)	Donald L. Russell	1962-
12/5W-20K(1)	C. A. McDonald	1962- 1/
12/6W-12P(1)	Hobin Lumber Company	1962-
13/5W-7R(2)	Claude Mariner	1966-
13/5W-22B(1)	Malcolm Thompson	1965-
14/5W-10R(1)	Chris Lindseth	1962- 1/

CLACKAMAS COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
2/1-2N(1)	City of Lake Oswego	1964-
2/1-4L(1)	Chester Bohlman	1963-
2/1-21N(1)	Paul Riegelmann	1963-
2/2-15D(1)	Byrum Morehouse	1962- 1/
2/3-2G(1)	Vernon DeYoung	1962-
2/3-6F(1)	Lewis Isaacs	1962-
2/3-10C(1)	Mas Fujimoto	1962-
2/3-31L(1)	Howard DeLano	1962-
2/4-4R(1)	M. K. Smith	1962- 1/
2/4-5M(1)	Earl Meiers	1962-
2/4-7B(1)	Jerry Tate (O'Shia)	1962-
2/4-27D(1)	Sandy Farms	1962-
2/4-29J(1)	Virgil Nelson	1962-
2/5-18G(1)	Frank Leitheiser	1962-
3/1W-10N(1)	Charles Jenkins	1951- 1/
3/1W-14K(1)	Black Inc.	1951-
3/1W-15L(1)	Dammasch State Hospital	1959-
3/1W-16R(1)	Dammasch State Hospital	1961-
3/1W-23A(1)	Teufel Holly Farm	1964-
3/1W-25K(1)	Oregon State Experimental Farm	1963-
3/1-7H(1)	Frank Hoyt	1963-
3/1-26E(1)	Amil R. Slaby	1962-
3/1-32R(1)	D & S Farm Inc.	1962-
3/1-34F(2)	Ivan Arneson	1962-
3/1-34P(1)	Frank Delforge	1962- 1/
3/1-36N(1)	Joe Demsher Jr.	1960-
3/1-36N(2)	L. H. Davis	1960-
3/2-35B(1)	F. H. Hunt	1965-
3/4-26P(1)	W. O. Youngberg	1963-
4/1-4G(1)	John W. Beck	1962-
4/1-20C(1)	Robert May	1965-
5/1-5R(1)	A. D. Rogie	1962-
5/1-18F(1)	Warren Bremer	1962-
5/2-5M(1)	Norman Simmons	1965-
5/2-17G(1)	Howard Brockart	1963-
5/3-5A(1)	Marvin W. O'Dell	1965-

1/ Hydrograph of this well shown in this report
2/ Measurements discontinued

WELL NO.	OWNER	RECORDS AVAILABLE
6/2-14A(1)	Harry Schoenborn	1963-

CLATSOP COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
8N/7W-24A(1)	Oregon State Game Commission	1963-
8N/8W-27C(1)	Howard T. Multhauf	1963-

COLUMBIA COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
4N/1W-31P(1)	John Havlic	1967-
4N/2W-13F(1)	Paul J. DeShazer	1963-
5N/1W-17R(1)	Shell Oil Company	1965-

COOS COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
23/13W-34G(1)	Pacific Power & Light Company	1957-1967 2/
24/13W-10L(1)	Pacific Power & Light Company	1957- 1/
24/13W-28P(1)	Pacific Power & Light Company	1957- 1/
24/13W-33G(1)	Pacific Power & Light Company	1957- 1/
25/13W-4M(1)	Pacific Power & Light Company	1956-1967 2/
27/13W-27C(1)	City of Coquille	1963- 1/
28/14W-18H(1)	Bullard Beach State Park	1965- 1/

CROOK COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
14/15-15Q(1)	L. H. McPhetridge	1945- 1/
14/16-19H(1)	Leslie Clauson	1944- 1/
14/16-31D(1)	Pacific Power & Light Company	1964-
14/16-31Q(1)	Pacific Power & Light Company	1964-
14/16-32M(1)	Pacific Power & Light Company	1964-
14/16-32N(1)	E. E. Wagoner	1944- 1/
15/16-5E(1)	Pacific Power & Light Company	1964-
15/16-5E(3)	Pacific Power & Light Company	1964-
15/16-6A(1)	Dorn Brothers	1944-1965 2/
20/22-25R(1)	G. I. Ranch	1964-
21/22-3D(1)	G. I. Ranch	1963-

CURRY COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
41/13W-9G(1)	Roger Oliver	1967-
41/13W-9Q(1)	Minnie Glendenin	1966-
41/13W-9Q(2)	E. L. Rigdon	1966-
41/13W-16C(1)	Robert Swan	1967-

DESCHUTES COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
14/10-7Q(1)	Indian Ford Guest Ranch	1963-
15/10-8G(2)	Ross Hammond	1960- 1/
19/11-32N(1)	Sunriver Prop. Inc.	1967-
20/11-6Q(1)	Sunriver Prop. Inc.	1967-
21/10-19N(1)	Inez Kellems	1945- 1/
22/21-8G(1)	Elton Jackson	1959-
22/21-16D(1)	Elton Jackson	1961-

DOUGLAS COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
21/4W-19R(1)	Douglas County Parks Dept.	1963- 1/
23/5W-15N(1)	W. S. Carlson	1963-
24/5W-5N(1)	Rex Tollefson	1963- 1/
26/5W-6B(1)	Stanley Mohr	1963-
27/5W-24J(1)	Douglas County Parks Dept.	1963- 1/
29/8W-16E(2)	Walter Plikat	1967-
30/5W-21G(1)	Douglas County Parks Dept.	1963- 1/
32/6W-35B(1)	George H. Wells	1963- 1/

GILLIAM COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/22-5K(1)	Gene Mulkey	1965-
1N/22-8B(1)	D. L. Lemon	1964- 1/
3N/21-28D(1)	City of Arlington	1964- 1/
3N/21-34B(1)	E. M. Hulden	1964-

LIST OF OBSERVATION WELLS

GRANT COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
9/30-26G(1)	L. F. McGirr	1966-
10/28-8G(1)	Theron King	1966-
11/29-25K(1)	Cecil Bryant	1966-
11/30-6A(1)	Frank McGirr	1966-
12/26-34J(1)	Dayville Cemetery	1963- 1/
13/29-22L(1)	Curtice Martin	1962- 1/
13/30-27A(1)	Oregon State Highway Dept.	1964- 1/
13/31-21N(1)	Mt. View Country Club	1963- 1/
13/31-23M(1)	City of John Day	1962-
13/31-26F(1)	City of John Day	1962-
16/30-28R(1)	Robert Lemcke	1966-
17/31-2C(1)	Wesley Kriege	1966-
18/31-12A(1)	Harry Pon	1966-

HARNEY COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
19/31-13G(1)	Harry Pon	1966-
19/31-13J(1)	Harry Pon	1966-
22/30-27R(1)	Werner Arntz	1966-
22/31-28R(1)	Harry Pon	1966-
22/31-34N(1)	L. F. Lazaus	1930- 1/
22/32½-30P(1)	Jack McGes	1966-
22/33-27J(1)	John Temple	1966-
23/27-30B(1)	Green Valley Ranch	1962- 1/
23/31-3D(2)	Harney County	1936-
23/31-5B(1)	Harry Pon	1962-
23/31-11Q(1)	E. Sewell	1959- 1/
23/31-11Q(2)	E. Sewell	1959-
23/31-14A(3)	Harney County	1936-
23/31-16E(1)	Harney County	1936-
23/31-16K(1)	T. Allen Jones	1930- 1/
23/31-33E(1)	Harney County	1936-
23/32-3A(2)	Meadowland Ranches Inc.	1965-
23/32-7L(2)	Emmett Ray	1928-
23/32-28B(2)	Hugh Casey	1966-
23/32-30R(1)	Harney County	1936-
23/32½-1D(1)	Dick & Ed McConville	1965-
23/33-36H(1)	Kenneth Mann	1966-
24/30-7P(1)	Adolf Kisle	1966-
24/30-26R(1)	John Campbell	1960- 1/
24/31-28E(1)	Harney County	1936- 1/
24/32½-30R(1)	Ansel Marshall (Catterson)	1963-
24/34-31C(1)	John Rossberg	1959- 1/
24/34-31N(1)	John Rossberg	1963-
24/34-31P(1)	John Rossberg	1960-
24/34-31R(2)	John Rossberg	1959-
25/30-34B(1)	Forrest Reed	1963-
25/31-4M(1)	James Stahl	1962- 1/
25/31-29N(1)	Edgar Koeneman	1964-
25/34-30Q(1)	Forrest Skinner	1960-
26/31-26D(1)	Harney Co. Land Development Corp.	1965-
26/31-34R(1)	Marcus J. Haines	1964-
26/33-13J(1)	Lester Thompson	1962-
26/33-19N(1)	De B. Forslund	1959-
26/33-19R(1)	De B. Forslund	1959-
26/33-28Q(1)	De B. Forslund	1958-
26/33-33C(1)	De B. Forslund	1958- 1/
26/33-34G(1)	Guy Leslie	1956-
26/33-34N(2)	George H. Merrick	1958-
26/34-6C(1)	John J. Fecht	1960- 1/
26/34-6J(1)	H. C. Fitchett	1960-
26/34-19K(1)	F. E. Jones	1959-
27/31-1G(1)	John Crow	1961- 1/
27/33-2D(1)	R. F. Upton	1956- 1/
27/36-33G(1)	FloLea Holly	1963-
31/35-2D(1)	Fred Pallock	1954- 1/
33/34-24D(1)	Alvord Ranch	1965-
34/34-15G(1)	Alvord Ranch	1962- 1/
35/33-34Q(1)	Andrew Shull	1958- 1/
36/33-3B(1)	Allied Properties Inc.	1962-
37/36-10M(1)	Whitehorse Ranch	1962-
37-36-14A(1)	Whitehorse Ranch	1962- 1/
37/36-15M(1)	Whitehorse Ranch	1962-
39/35-4N(1)	Warren McLean	1964-
39/35-25G(1)	Trout Creek Ranch	1967-

HOOD RIVER COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
2N/8-5J(1)	U. S. Forest Service	1965-
2N/10-4K(1)	W. B. Graham (White)	1964-
2N/10-4K(2)	B. Ross Evans	1964-

JACKSON COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
36/1W-21A(1)	Bud Hoover	1960- 1/
36/2W-23N(1)	U. S. Geological Survey	1953- 1/
36/2W-25H(1)	Alex Legler	1960-
37/2W-28B(1)	So. Oregon Experimental Station	1960- 1/
38/1W-15L(1)	City of Phoenix	1960- 1/

JEFFERSON COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
11/12-21A(1)	Portland General Electric Co.	1962-
11/12-26J(1)	Portland General Electric Co.	1962-
11/13-1D(1)	City of Madras	1964-
12/13-6D(1)	Fred Degner	1964-1967 2/
12/15-21N(1)	Morrow Brothers	1965-
13/14-33J(1)	Buckner Brothers	1964-

JOSEPHINE COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
33/6W-15N(1)	Southern Pacific Railroad	1963-
35/6W-21F(1)	Bate Lumber Company	1961-
35/6W-24D(1)	Oregon State Highway Dept.	1963- 1/
36/5W-31L(2)	Grants Pass Golf Club Inc.	1964-
36/6W-27G(1)	Fort Vancy Job Corps Center	1966-
36/6W-27G(2)	Fort Vancy Job Corps Center	1966-
38/5W-23H(1)	John Katzenbach	1961- 1/
38/8W-33H(1)	J. R. Smith	1961- 1/
39/5W-6K(1)	Brown Bros. Lumber Co. Inc.	1962-
39/8W-17J(1)	Joseph Ollis	1961-
39/8W-34L(1)	U. S. Geological Survey	1952- 1/

KLAMATH COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
25/8-1D(1)	U. S. Forest Service	1966-
27/8-20A(1)	U. S. Forest Service	1963-
28/8-17K(1)	Winema Lumber Company	1962- 1/
30/7-11G(1)	Crown Zellerbach Inc.	1954- 1/
31/7-1H(1)	Yamsey Land & Cattle Co.	1962-
34/7-9B(1)	Collier State Park	1955-
34/8-28R(2)	Rafter MD Ranch	1967-
35/7-34M(1)	H. C. Spicer	1965-
35/8-1E(1)	Henry Wolff	1954- 1/
35/10-19B(1)	Ted Chrume	1954- 1/
35/10-29E(1)	Roy Gooing	1967-
36/10-14G(1)	K. R. Newlun	1962- 1/
36/11-17Q(1)	Ernest Firsick	1967-
36/11-20Q(1)	Yanaix Ranch (Bertran)	1962-
36/11-36A(1)	Bill Gallaher (McBain)	1954- 1/
36/12-12Q(1)	Weyerhaeuser Timber Co.	1962-
36/12-14M(1)	Jim Dodowa (Rec. Hall)	1954-
36/12-28H(1)	Mike Deely	1962-
36/14-7H(1)	Harry Obenchain	1962-
36/14-25E(1)	Gerber, Montgomery & Reed	1962-
36/14-27P(1)	Henry Gerber	1962- 1/
36/14-35R(1)	Basil Hall	1962-
37/10-8N(1)	Edgewood Ranch	1961- 1/
37/10-18B(1)	Cliff McMillan	1961-1967 2/
37/10-19H(1)	H. D. Whiteline	1961-
37/10-29K(1)	Edgewood Ranch	1949-
37/10-29K(2)	Edgewood Ranch	1949- 1/
37/10-30C(1)	Fred Coleman	1961-
37/11½-36H(1)	Donald Schreiner	1957-
38/10-9M(3)	R & S Ranch	1949-
38/10-13D(1)	Swan Lake Ranch	1949-
38/10-16Q(2)	Mrs. Maude E. Liskey	1957-
38/10-22C(1)	Mike Short	1957- 1/
38/10-23F(1)	Gene Carl	1957-
38/10-25A(1)	Garrison Mitchell	1957- 1/

LIST OF OBSERVATION WELLS

WELL NO.	OWNER	RECORDS AVAILABLE
38/11-6R(1)	R. J. Jendrzejewski	1957- 1/
38/11½-6L(1)	Swan Lake Ranch	1957-
38/11½-7R(1)	Swan Lake Ranch	1952-
38/11½-11H(1)	Frank & Mathilda Challis	1957-
38/11½-12N(2)	Frank Challis	1949- 1/
38/11½-13G(1)	R. M. Robertson	1948-
38/11½-13N(1)	William Konig	1948- 1/
38/11½-15R(1)	Frank R. White	1948- 1/
38/11½-25M(1)	Richard Hoefler	1949-
38/11½-30M(1)	Swan Lake Ranch	1957-
38/11½-30R(1)	David Moore (Wheeler)	1957-
38/11½-30R(3)	David Moore (Wheeler)	1948-
39/9-34P(1)	Harry Wagner	1964-
39/10-8J(1)	Mt. Calvary Cemetery Ass'n	1965-
39/11-10R(1)	Lost River Cemetery	1963-
39/11-20A(1)	Robert Woods	1964-
39/11-26M(1)	D & S Distributing Corp.	1966-
39/11½-3B(1)	L. J. Horton	1957- 1/
39/11½-28R(1)	W. Tuback	1954-
39/12-29K(1)	Robert Vogel	1954-
39/12-36L(1)	Lloyd Crawford	1954-
40/11-11C(1)	A. W. Schaup	1954-
40/11-13F(2)	Laddie Rajnus & Sons	1963-
40/12-33C(1)	Clark Unruh	1965-
41/10-10L(1)	Fotheringham Brothers	1964-1965 2/
41/12-3M(1)	George Rajnus	1954-
41/12-19G(1)	D. P. Reid	1954-
41/14-7R(1)	Charles Kilgore	1954-

LAKE COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
25/14-15E(1)	Ira A. Dutcher	1932-
25/14-16H(1)	Marion Cook	1956-
25/14-19R(1)	R. A. Long	1948-1967 2/
25/14-22D(1)	C. B. Webster	1949-
25/14-29J(1)	R. A. Long	1956-
25/14-36N(1)	Joe & Minnie Stitz	1956-
25/19-31Q(1)	O. E. White	1963-
26/14-2D(1)	U. S. B. L. M.	1948-
26/14-3D(1)	Fred Meyers	1956-
26/14-5A(1)	V. A. Wagers	1940- 1/
26/14-12A(1)	Sheldon D. Kelley	1948-
26/14-12C(1)	Elmer Kohler	1958- 1/
26/14-13N(1)	Andrew Bettencourt	1957-
26/14-20N(1)	G. R. Boatwright	1940-
26/14-21R(2)	U. S. B. L. M.	1940-
26/14-23D(1)	U. S. B. L. M.	1959-
26/14-24P(1)	Jack Kittridge	1956-
26/14-33C(1)	U. S. B. L. M.	1940-
26/15-5C(2)	George Wirth	1957-
26/15-6M(1)	Glenn Irwin	1955-
26/15-6H(1)	Glenn Irwin	1960-1967 2/
26/15-17R(1)	Morehouse Ranch	1940-
26/15-20D(1)	U. S. B. L. M.	1940-
26/15-20Q(1)	Hugh L. Wahl	1956-
26/15-22B(2)	M. Y. Parks	1932-
26/15-29E(1)	Hugh L. Wahl	1940-
26/15-31A(3)	Nick Klerk	1949- 1/
26/15-31E(1)	Nick Klerk	1949-1967 2/
26/15-31J(1)	Robert R. Tuttle	1956-
26/15-32E(1)	Robert R. Tuttle	1956-
26/15-32E(2)	Robert R. Tuttle	1956-
26/15-33H(1)	Merritt Parks	1962-
26/15-34N(1)	Merritt Parks	1956-
26/15-34Q(1)	C. W. Boley	1956-
26/18-26B(1)	Robert Bothern	1963-
26/18-30H(1)	Sam K. MoreHouse	1959-
27/15-2E(1)	C. C. Miles	1949-
27/15-2E(2)	C. C. Miles	1956-
27/15-2H(2)	Lawrence B. Iverson	1949-
27/15-3B(1)	Easton Claridge	1956-
27/15-3J(1)	Easton Claridge	1949-
27/15-4G(1)	M. Y. Parks	1932- 1/
27/15-4G(2)	M. Y. Parks	1932-
27/15-11H(1)	K. O. Buick	1961-
27/15-11J(1)	K. O. Buick	1956-
27/15-13D(1)	Jess Miles	1949-
27/15-24C(1)	Darrell Bowen	1959-
27/15-24N(2)	Darrell Bowen	1961-
27/15-24N(1)	Darrell Bowen	1948-
27/15-25E(1)	Alfred Smithee (Koehler)	1956-
27/16-7D(1)	Wayne Dubois	1956-
27/16-7F(1)	Wayne Dubois	1961-
27/16-13A(1)	Robert Morehouse	1955-
27/16-13B(1)	Robert Morehouse	1958- 1/
27/16-13M(1)	Robert Morehouse	1955-
27/16-26P(1)	John Beck	1963-
27/16-32F(1)	Lowe & Whipple	1956-
27/16-32Q(1)	Miller E. Follis	1957-
27/16-34L(1)	Dr. George E. Mallet	1957-
27/17-19B(2)	M. Penn Philips Co.	1961-
27/17-14N(1)	U. S. B. L. M.	1961-
27/17-22D(1)	Helmar Gustafson	1961-
27/17-22R(2)	Century Ranch	1938- 1/
27/17-27K(1)	Century Ranch	1961-
27/17-27L(1)	Century Ranch	1952-
27/18-6E(2)	Rose T. Morici	1940-
27/18-6F(1)	Marianne Aiassa	1959-
27/18-6G(1)	Clinton B. Carrico	1956-
27/18-6K(1)	Clinton B. Carrico	1956-
27/18-12A(1)	John Pettus	1961-
27/18-18N(1)	Jack Gillette	1959-
27/18-21A(1)	U. S. B. L. M.	1955-
27/19-18N(1)	View Point Ranch	1957-
27/19-19Q(1)	View Point Ranch	1957-
27/19-29F(1)	View Point Ranch	1961-
27/19-32C(1)	View Point Ranch	1958-
28/14-20B(1)	Lawrence Iverson	1965-
28/14-21K(1)	U. S. Forest Service	1963-
28/14-25C(1)	ZX Ranch	1964-
28/15-13P(1)	View Point Ranch	1958-
28/15-14H(2)	View Point Ranch	1956-
28/16-4B(1)	U. S. B. L. M.	1958-
28/16-4D(1)	U. S. B. L. M.	1956-
28/16-5F(1)	Miller E. Follis	1959-1967 2/
28/16-5P(1)	Miller E. Follis	1959-
28/16-5Q(1)	Miller E. Follis	1959-1967 2/
28/16-19C(1)	View Point Ranch	1960-
29/23-3J(1)	U. S. B. L. M.	1945-
30/16-1F(1)	Oregon State Game Commission	1963-
32/23-5A(1)	U. S. B. L. M.	1964-
33/18-13A(1)	Alan & Van Withers	1963-
34/19-16N(1)	Howard Beachler	1962-
34/19-23G(1)	ZX Ranch	1959-
35/24-9J(1)	U. S. B. L. M.	1949- 1/
36/21-6B(1)	S. V. Carroll	1950-
36/24-4B(1)	Joe Banasco	1962-
36/24-27D(2)	Con Lynch	1961- 1/
36/24-28M(1)	Lloyd Grisel	1949-
36/24-28N(1)	Joe Rombo	1960-
36/24-32A(1)	James Kiely	1940-
36/24-33B(3)	Con Taylor Ranch Inc.	1960- 1/
37/20-34R(1)	Robert Weir Jr.	1962- 1/
38/20-33F(1)	Jack Stooksberry	1964-
38/24-27M(1)	Charles Crump	1948- 1/
39/19-34H(1)	William Hoffman	1960- 1/
39/20-9A(1)	Lakeview Mining	1965- 1/
39/24-21F(2)	J. G. Dyke	1948- 1/
40/19-19K(1)	Clyde Fenimore	1965-
40/20-14D(1)	Snider & Alexis	1957- 1/
40/20-26L(2)	Neal Elliott	1959- 1/

LANE COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
16/2W-34P(1)	M. A. Nadeau	1962- 1/
16/3W-32G(1)	Leo Sidwell	1950- 1/
16/3W-32K(5)	Leon Funke	1966-
16/4W-4B(1)	John Hentze	1965-
16/4W-16L(2)	Shadow Hills Golf Course	1965-
16/4W-29J(2)	Elbert Hill	1965-
17/1W-29G(1)	Glen Vaughn	1965-
17/1W-29R(1)	Ed Hull	1965-
17/2W-32C(1)	Weyerhaeuser Timber Co.	1962- 1/
17/3W-17D(1)	Smith Gardens	1962-
17/3W-19L(1)	Gheen Irrigation Works	1966-
17/3W-22A(3)	C. E. Blakely	1966-
17/3W-28Q(1)	Chase Gardens	1962-

LIST OF OBSERVATION WELLS

WELL NO.	OWNER	RECORDS AVAILABLE
17/4W-4Q(1)	Seneca Sawmill	1962-
17/4W-33B(1)	West Lawn Memorial Cemetery	1962- 1/
17/5W-13F(1)	Leo Burtis	1962-
17/6W-36Q(1)	Oscar E. Williams	1962-
18/2W-27F(1)	George Potter	1965-
18/2W-35L(1)	Richard Lyday	1965-
18/4W-3L(1)	Nils Hult	1963-
18/5W-19G(1)	Crow-Applegate School Dist. 66	1966-
18/10W-11A(1)	United States Plywood	1963-
18/12W-14P(4)	U. S. Geological Survey	1961-
18/12W-34Q(1)	Camp Florence	1964-
19/2W-7R(1)	J. L. Gatchell	1962-
19/3W-3N(1)	Oregon State Game Commission	1962-
19/3W-11C(1)	O. C. Luchterhand	1963-
20/3W-11C(1)	Gettings Creek Rest Area	1966-
21/3-16J(2)	City of Oakridge	1966-

LINCOLN COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
6/10W-33F(1)	A. A. Corkhill	1964-
8/10W-17K(1)	A. E. Howard	1964-
10/10W-3N(1)	Don Pressey	1964-
11/9W-9H(1)	Eddyville High School	1964-
11/10W-20L(1)	Joe W. Brown	1964-

LINN COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
9/1W-14Q(1)	John Fery	1964-
9/1W-23P(1)	Charles Hecht	1962- 1/
9/2-20P(1)	North Santiam Plywood Co.	1966-
10/1W-5L(1)	A. M. Hendrickson	1962-
10/1W-28F(1)	Grant Farris	1962- 1/
10/2W-8N(2)	William Uppetad	1957-
10/2W-21R(1)	H. C. Robertson	1962-
10/4W-12F(2)	Henry Hoefer	1928- 1/
11/2W-3D(1)	Sam Looney	1962-
11/2W-6B(1)	George C. Scheler	1962-
11/2W-26F(1)	Marvin Ufford	1966-
11/2W-29H(1)	Neal Hollingsworth	1962-
11/3W-13A(1)	Loren A. Neleon	1962-
11/3W-15C(1)	Joe Kennel	1962-
11/3W-26A(1)	Leonard Roth	1962-
12/1W-29N(1)	Pineway Golf Club Inc.	1964-
12/1W-29P(1)	Hubert J. Griffiths	1964-
12/1W-30R(1)	Pineway Golf Club Inc.	1962-
12/2W-2C(1)	Ken Watters	1962-
12/2W-14B(1)	Wilbur Parrish	1941-1967 2/
12/2W-18C(1)	Henry DeManette	1962- 1/
12/3W-5K(1)	George N. Chandler	1962-
12/3W-29P(1)	R. L. Wirth	1962-
12/4W-21L(1)	R. C. Mang	1962-
12/4W-35P(1)	Paul Pugh	1962-
13/3W-13A(2)	Frank Cochran	1962-
13/3W-34N(1)	Jacob Ogle	1928-
13/3W-36H(1)	Thomas P. Irwin	1962-
13/1-27C(1)	Verdge Stephenson	1964-
13/1-27C(2)	Les Austin	1964-
13/1-27D(1)	Roy Lewis	1964-
13/1-27D(2)	Denver Davis	1964-
13/1-27F(1)	U. S. Government	1964-
13/1-27G(1)	U. S. Government	1964-
13/1-27G(2)	U. S. Government	1964-1966 2/
13/1-27G(3)	Paul Tucker	1964-
13/1-27J(1)	U. S. Government	1964-
13/1-27K(1)	Warren Vasey	1964-
13/1-27K(2)	U. S. Government	1964-
13/1-27K(3)	Lawrence Alvin	1964-
14/3W-7R(1)	Henry H. Kirk	1962-
15/3W-19H(1)	Edgar B. Grimes	1962- 1/

MALHEUR COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
14/38-27F(1)	Jerry Farley	1964-
14/39-21F(2)	Ralph Duncan	1962-
14/39-21Q(1)	Mary J. Molthan	1962-
14/39-29C(1)	John Molthan	1962-
14/39-29E(1)	John Molthan	1962-
14/39-32H(1)	Ray Duncan	1962-
15/40-1C(1)	Altha Anderson	1953- 1/
15/40-2J(1)	Max Holloway	1949- 1/
15/40-2L(1)	Max Holloway	1955-
15/40-2M(1)	Max Holloway	1952- 1/
15/40-2N(1)	Rankin Crow	1950- 1/
15/40-2Q(1)	Rankin Crow	1956-
15/40-10B(1)	Rankin Crow	1950-
15/40-10K(1)	Rankin Crow	1953- 1/
15/40-11P(1)	Rankin Crow	1950-
15/40-12M(1)	Guss Davis	1955- 1/
15/40-12O(1)	Guss Davis	1954-
15/40-13D(1)	Guss Davis	1955- 1/
15/40-13G(1)	Guss Davis	1955-
15/40-14Q(1)	Rankin Crow	1951- 1/
15/41-6M(1)	Rankin Crow	1958-
15/41-8N(1)	Rankin Crow	1951- 1/
15/42-25B(1)	Mark J. Velsmeyer	1961-
16/43-5K(1)	Estel B. Moser	1966-
16/43-16Q(1)	Ralph Altig	1962-
17/44-11K(1)	John Stringer	1961-
17/44-25H(1)	C. N. Durrett	1961-
18/41-8Q(1)	Roy C. Stewart	1963-
18/44-18G(1)	Paul Fleming	1965-
18/45-21D(1)	K. T. Loomis	1962-
18/46-19N(1)	Glen Hutchinson	1962-
18/46-23Q(1)	Kay Teramura	1962-
18/47-17D(1)	Earl Weaver	1950-
19/42-35D(1)	John E. O'Toole	1963-
19/43-2M(1)	Trenkel Brothers	1961-
19/43-3E(1)	Floyd Vaughn	1961-
19/43-3K(1)	Floyd Vaughn	1961-
19/43-10H(1)	Thomas J. Davis	1961-
20/46-28G(1)	George Mendazona	1962-
21/38-17Q(1)	Walter Bodkin	1955-
21/38-17R(1)	U. S. Geological Survey	1958-
21/46-2F(1)	Willis Bertram	1965-
28/37-23R(1)	Earl Obenchain	1950-
29/37-17N(1)	Fred Pallock	1965-
29/45-36R(1)	Jeff Anderson	1966-
29/46-31L(1)	Cowgill Ranch	1964-
30/46-2H(1)	Jordan Valley Cemetery Dist.	1962- 1/
30/46-10N(5)	Jaca Brothers	1963- 1/
32/40-18K(1)	Clarence J. Eckstein	1950-
34/39-13L(1)	U. S. Government	1954-
36/41-26J(1)	Oregon State Highway Dept.	1961- 1/
41/42-22C(1)	Lucky 7 Ranch	1962- 1/
41/43-19A(1)	Victor Albisu	1955-

MARION COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
3/1W-33H(1)	Klupenger Nursery	1965-
4/1W-2C(2)	Will E. Dreher	1965-
4/1W-5P(2)	Joseph Leavy	1965-
4/1W-23G(1)	Donald Olmstead	1945- 1/
4/1W-32H(1)	Emmett T. Rose	1960-
4/2W-2G(1)	Champoeg State Park	1963-
4/2W-4C(1)	Dr. C. A. Bump	1928-
4/2W-4F(1)	John A. Gearin	1957-
4/2W-8G(1)	Nelson Tribbett	1960-
4/2W-15F(1)	W. O. Wildmar	1957-
4/2W-17M(1)	Lester Ernst	1957-
4/2W-18A(1)	John P. McCarthy	1957-
4/2W-22M(1)	Kirk Brothers	1957- 1/
4/2W-28N(1)	J. B. Wolf	1957-
4/2W-29H(1)	Richard McKay	1960-
4/2W-34R(1)	Charles Johnson	1928-
5/1W-3K(1)	Manton Carl (Ramlo)	1959- 1/
5/1W-7P(1)	City of Woodburn	1963-
5/1W-9L(1)	S. Gayken	1963-
5/1W-17L(2)	General Foods Corp.	1963-
5/1W-17M(2)	General Foods Corp.	1962-
5/1W-17N(1)	General Foods Corp.	1962-
5/1W-17N(2)	General Foods Corp.	1962-
5/1W-18C(1)	City of Woodburn	1962-

LIST OF OBSERVATION WELLS

WELL NO.	OWNER	RECORDS AVAILABLE
5/1W-18C(2)	City of Woodburn	1962-
5/1W-18Q(1)	Lawrence J. Paradis	1962-
5/1W-18R(1)	Lawrence J. Paradis	1962-
5/2W-1R(1)	City of Woodburn	1965-
5/2W-5E(1)	William J. Manegre	1957-
5/2W-16D(1)	James E. Davidson	1958-
5/2W-19Q(1)	Jess W. Lucas	1957-
5/2W-25M(1)	Sam H. Brown	1929- 1/
6/1W-1G(1)	James Butsch	1962-
6/1W-1P(1)	Mark Purdy	1962-
6/1W-18D(1)	James Hollin	1962-
6/1W-28F(1)	Tony Schultz	1962-
6/2W-5N(1)	Fred Zelinsky	1957-
6/2W-17J(2)	Sam Ramp	1962-
6/2W-18G(1)	E. A. Hillyer	1957- 1/
6/2W-35B(1)	Richard Tuve	1963-
6/3W-34G(1)	Juanita Manuel	1957-
6/3W-34N(1)	Henry Schmidt	1963-
6/1-7M(1)	Sheldon Johnson	1928-
7/1W-8J(1)	Merle Kaufman	1964-
7/1W-27N(1)	Keith Johnson	1962-
7/2W-4F(1)	P. W. Woelke	1962- 1/
7/2W-18B(1)	Emery Alderman	1962-
7/2W-26G(1)	Cornelius Bateson	1962-
7/2W-31D(1)	William Roth	1963-
7/3W-11L(1)	Harvey Machine Co. Inc.	1960-
7/3W-23N(1)	Pacific Mutual Life Insurance Co.	1962-
7/3W-27A(3)	State Labor & Industries Building	1963-
7/3W-31G(1)	Carl Heyden	1962-
7/3W-31L(1)	E. C. Boje	1962-
7/3W-31P(1)	Illahe Country Club	1962-
7/3W-32K(1)	Salem Golf Course	1962-
8/1W-28G(1)	Josephine Gerspacher	1962-
8/1W-32D(1)	Earl Saiser	1962-
8/1W-35C(1)	Richard Schumacher	1962-
8/2W-11P(2)	Reich Brothers	1962-
8/2W-33K(1)	Anna Etzel	1963-
8/3W-4M(1)	Carroll Nelson	1962-
8/3W-4M(2)	David Van Dyke	1964-
8/3W-5R(4)	E. A. Meola	1964-
8/3W-6B(1)	Illahe Country Club	1962-1966 2/
8/3W-6D(1)	Harry Eyerly	1962-
8/3W-9P(1)	City of Salem	1960-
8/3W-10K(2)	City of Salem	1967-
8/3W-10K(4)	City of Salem	1959-
8/3W-11N(1)	City of Salem	1962- 1/
8/3W-18R(1)	Adrian Withers	1962-
8/3W-23M(2)	W. G. Steveley	1962-
8/3W-28J(2)	Friends Church	1962-
8/3W-33J(1)	L. J. Philpott	1962-
8/4W-27M(1)	4-D Farms	1963-
9/1W-1E(1)	Etzel Brothers	1958-
9/1W-2R(1)	Al Etzel	1963-
9/1W-12B(1)	William Ripp	1961-
9/2W-24L(2)	Boyd Hilton	1963-
9/2W-24R(1)	A. F. Keithley	1957-
9/2W-26A(1)	Louis Scofield	1961- 1/
9/3W-34J(2)	Ted Riggle	1964-
9/1-3E(1)	Ted Etzel	1965-
9/3-30J(1)	Howard Fenner	1964-
10/3W-13C(1)	E. W. Hart	1962-
10/3W-13F(1)	E. W. Hart	1962-
10/5-2J(1)	James Colmer	1966-

MORROW COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/26-10A(2)	William Doherty	1965-
1N/26-26M(1)	Kenneth Turner	1963-
1N/27-3A(1)	George Luciani	1965-
1N/27-3R(1)	Earl Wattenburger	1961-
1N/27-10G(1)	Earl Wattenburger	1963-
1N/27-10H(1)	W. Floyd Hoskins	1961-
1N/27-24R(1)	Antone J. Vey	1961-
1N/28-28C(1)	Antone J. Vey	1960-
1N/28-28D(1)	Antone J. Vey	1958-
2N/23-17R(1)	Hynd Brothers Inc.	1964-
2N/26-20K(1)	Nelson-Tucker Ranches	1967-
2N/27-20J(1)	Ed Tucker	1961-
3N/26-4A(1)	Mildred F. Cramer	1962-
3N/26-4L(1)	Luther W. Cramer	1962- 1/
3N/26-5M(1)	Otto J. Hellberg	1962-
3N/26-10G(1)	Waldo H. Cramer	1962-
3N/26-10J(1)	Ernest R. Cramer	1962-
3N/26-10K(1)	Ernest R. Cramer	1962-
4N/25-9G(1)	Boardman Cemetery Association	1965-
4N/26-25E(1)	Fred Andrews	1953-
4N/27-5B(1)	Umatilla Army Depot	1960- 1/
4N/27-5C(1)	Umatilla Army Depot	1962-
4N/27-8R(1)	Umatilla Army Depot	1961- 1/
4N/27-18P(1)	Umatilla Army Depot	1960-
4N/27-19B(1)	Umatilla Army Depot	1962- 1/
4N/27-20M(1)	Union Pacific Railroad	1965-
4N/27-28E(2)	Scott Chapman	1962-
4N/27-32B(1)	Roy G. Holzapfel	1962-
4N/27-32J(1)	Roy G. Holzapfel	1962- 1/
4N/27-33H(1)	McDole Brothers	1962-
1/24-7F(1)	A. H. Marick	1965-
1/29-3A(1)	Antone J. Vey	1963-
2/24-36J(1)	Terrell Benge	1964-

MULTNOMAH COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/1-33C(2)	Good Samaritan Hospital	1961- 1/
1N/1-33L(1)	Fred Meyer Inc.	1961- 1/
1N/1-33Q(1)	U. S. National Bank	1946-
1N/1-34N(1)	Weisfield's Inc.	1940- 1/
1N/1-34N(3)	Equitable Savings & Loan	1961-
1N/1-34N(6)	Pittock Block Inc.	1961- 1/
1N/1-34N(8)	Lipman Wolfe & Co.	1961-
1N/1-34N(11)	Dirks Medical Center	1961- 1/
1N/1-34N(12)	Federal Reserve Bank	1961-1967 2/
1N/1-34N(13)	U. S. National Bank	1961-
1N/1-34N(14)	First National Bank	1959-
1N/2-9N(1)	Port of Portland	1963- 1/
1N/3-26R(1)	Kazuo Fujii	1963- 1/
1/1-3D(3)	Pacific Power & Light Co.	1961-1967 2/
1/1-3D(6)	Pacific Service Building	1961-
1/1-3E(1)	Oregonian Publishing Co.	1961-
1/1-3E(2)	Oregonian Publishing Co.	1961-
1/1-3E(3)	Oregonian Publishing Co.	1961-
1/1-3M(1)	Pacific Northwest Bell	1963-
1/1-3M(2)	Pacific Northwest Bell	1963-
1/1-4A(2)	Medical-Dental Building	1958-
1/1-10P(1)	J. Donald Kroeker	1961- 1/
1/3-7N(1)	Meadowland Dairy	1964- 1/
1/3-10M(1)	Forest Lawn Memorial Park	1963- 1/

POLK COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
6/3W-7H(1)	D. L. Gingerich	1963-
6/4W-17K(1)	John Romig	1963-
7/3W-10E(1)	Leland P. Brandt	1962- 1/
7/3W-18E(1)	Orchard Heights Water Dist.	1965-
7/3W-18E(2)	Orchard Heights Water Dist.	1965-
7/3W-30F(1)	R. L. Forster	1965-
7/3W-30F(2)	R. L. Forster	1966-
7/4W-6R(1)	Art Lappin	1965-
8/4W-3B(1)	Theodore C. Muller	1962- 1/
8/4W-21E(2)	Boise Cascade Corp.	1962-
8/5W-13H(1)	Milo Jensen	1963-
8/6W-22F(1)	Edward Bakke	1962- 1/
8/6W-25R(1)	Max B. Morton	1963-
9/4W-8N(1)	D. W. Christianson	1963- 1/
9/4W-11F(1)	Donald Cobine	1965-

SHERMAN COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/17-4L(1)	Phillip G. O'Meara	1963- 1/
1N/17-16C(1)	L. P. Haven	1964-
3/16-10N(1)	E. J. Hartley	1963- 1/

LIST OF OBSERVATION WELLS

TILLAMOOK COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1/9W-18M(1)	Green Acres Motel	1962- 1/
1/9W-19C(1)	Tillamook Veneer	1962-
1/9W-27B(1)	Gaylord Shively	1962-
1/9W-27E(1)	Virgil Chadwick	1962- 1/
1/9W-29E(1)	Norman Burdick	1962-
1/9W-29K(1)	Fairview Water Dist. Inc.	1962-
1/9W-29L(1)	Fairview Water Dist. Inc.	1962-
1/9W-31E(1)	Lester E. Armstrong	1962-
1/9W-31P(1)	Tillamook Water Comm.	1962-
1/9W-32Q(1)	Elbert Leonnig	1962-
1/10W-12D(1)	Leo & Robert Wassmer	1962- 1/
1/10W-26B(1)	Rudolph John Fenk	1962-
1/10W-36R(1)	Frank Emmenegger	1962-
2/9W-5E(1)	Tillamook Water Comm.	1962-
2/9W-6G(1)	M. J. Jenck	1962-
2/9W-6J(1)	Connie & Judy Dye	1962-
2/9W-21E(1)	Vern Darby	1962- 1/
4/10W-27F(1)	James C. Trent	1965-

UMATILLA COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/32-10K(1)	Skyview Memorial Park	1965-
1N/32-22G(1)	J. L. Eldridge	1967-
2N/27-1F(1)	Claussie Ammon	1961-
2N/27-11H(1)	Clarence L. Hansen	1961-
2N/27-12D(1)	Clarence L. Hansen	1961-
2N/27-26L(1)	Sarvis Springs Ranch	1962-
2N/27-27E(3)	John F. Kilkenny	1961-
2N/30-28F(1)	Cunningham Sheep Co.	1961-
2N/32-2N(1)	City of Pendleton	1961- 1/
3N/27-25R(1)	George Wallace	1961-
3N/27-36H(2)	George Wallace	1961-
3N/28-8A(1)	Henry Walker	1967-
3N/28-28L(1)	E. A. Betz	1967-
3N/34-3D(1)	Berkley Davis	1953-
4N/27-22K(1)	Umatilla Army Depot	1960- 1/
4N/27-22P(1)	Umatilla Army Depot	1960-
4N/27-27J(1)	Hansell Brothers	1965-
4N/27-27J(2)	Hansell Brothers	1967-
4N/27-36D(1)	Lyle Miller	1961-
4N/28-10F(1)	City of Hermiston	1964-
4N/29-5R(1)	John Hershey	1963-
4N/29-17N(2)	Milton Culp	1961- 1/
4N/29-18J(1)	Milton Culp	1961-
4N/29-32L(1)	City of Stanfield	1964-
4N/32-2M(1)	L. King	1953-
5N/28-22D(1)	L. J. Martin (Munson)	1953- 1/
5N/34-16R(1)	E. M. Thompson	1953-
5N/35-1C(1)	William A. Bingman	1933- 1/
5N/35-1E(1)	City of Milton-Freewater	1963-
5N/35-2C(1)	K. A. Townsend	1933- 1/
5N/35-2J(1)	City of Milton-Freewater	1954-
5N/35-2L(1)	City of Milton-Freewater	1954- 1/
5N/35-3H(1)	Walter Miller	1933-
5N/35-12F(1)	City of Milton-Freewater	1954-
5N/35-12F(2)	City of Milton-Freewater	1954- 1/
5N/36-18M(1)	City of Milton-Freewater	1964-
6N/35-14L(1)	Conrad Miller	1933-
6N/35-20G(1)	J. E. Courtney	1933-
6N/35-24Q(1)	George H. Ransom	1933- 1/
6N/35-26C(2)	Earl Ransom	1933- 1/
6N/35-28H(1)	W. J. Rand	1933-
6N/35-28N(1)	Lottie McKnight	1933-
6N/35-30M(1)	Dan Selleck	1933-
6N/35-34C(1)	James A. Reese	1933-
6N/35-36C(1)	James Busch	1933-
6N/35-36H(1)	Walter Herman	1933-
1/32-9L(1)	Wayne Chapman	1961-
1/32-17G(1)	City of Pilot Rock	1961- 1/
1/32-17K(1)	City of Pilot Rock	1961- 1/
1/32-19P(1)	Arnold Hoeft	1964-
1/32-23J(1)	Hilmer Horn	1961- 1/
3/30½-1B(1)	Joseph Pedro	1953- 1/

UNION COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/39-4M(1)	Lee Smith	1964-
1N/39-15M(1)	Jim Morgan	1964- 1/
1/38-24R(1)	H. L. Wagner	1950- 1/
1/39-17L(1)	A. F. Furman	1940- 1/
1/39-20C(1)	Clayton Fox	1964- 1/
2/38-29E(1)	Tant Boothman	1967-
2/39-33P(3)	Wilfred Hamann	1964- 1/
3/38-3C(1)	City of Island City (Lester)	1963- 1/
3/38-6H(2)	City of La Grande	1957-
3/38-6Q(1)	Dr. Gilstrap	1957-
3/38-10B(1)	Union County	1936- 1/
3/39-7R(2)	Stanley Weishaar	1964- 1/
4/39-11H(2)	W. H. Woodruff	1964-
5/40-7L(1)	Emmitt Briegel	1964-
6/39-20C(1)	Edson R. McCanse	1962- 1/
6/39-20Q(1)	Edson R. McCanse	1962-1967 2/

WALLOWA COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/42-11P(1)	Boise Cascade Corp.	1967-
1/45-21E(1)	Gregory Wieck	1967-

WASCO COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/12-13N(1)	Julius Sandoz	1957- 1/
1N/12-13Q(1)	Kenneth Kortge	1957-
1N/12-23D(2)	Paul M. Martin	1962-
1N/12-28P(1)	Dalles City	1963-
1N/13-1F(1)	3-Mile Irrigation Coop. Inc.	1959-
1N/13-3E(1)	Dalles City	1959- 1/
1N/13-3G(2)	Columbia Fruit Growers	1956-
1N/13-4C(1)	P. J. Stadelman	1960-
1N/13-4E(1)	Odd Fellows Cemetery	1956- 1/
1N/13-4F(1)	Dalles City	1959-
1N/13-4P(1)	Dalles City	1959- 1/
1N/13-5G(1)	Cherry Heights Irr. Coop.	1959-
1N/13-8A(1)	G. S. Williams	1960- 1/
1N/13-8M(1)	Dalles City (Mill Creek)	1959-
1N/13-14L(1)	V. R. Martin (Douthit)	1959- 1/
1N/13-15G(2)	Parklawn Memorial Gardens	1959-
1N/13-17C(1)	George M. Davis et al	1958-
1N/13-18M(1)	Gladys L. Rogers	1957-
1N/13-32G(1)	Milton F. Martin	1946-
1N/13-32G(2)	Milton F. Martin	1956-
1N/13-32M(1)	Dr. John H. Skirving	1957-
1N/13-33M(1)	Sanders Brothers	1960-
1N/13-34L(1)	George Bradley (Westgate)	1960- 1/
2N/12-7E(1)	Darrel Evans	1963-
2N/12-7H(2)	A. Francois	1963-
2N/12-25R(1)	E. A. Kuck	1947-
2N/12-36P(1)	William Hertel	1962-
2N/12-36L(1)	Karl Thomsen	1962-
2N/12-36L(2)	J. Kenneth Fleck	1962-
2N/12-36L(3)	W. S. Nelson	1962- 1/
2N/13-28L(1)	Harvey Aluminum Co.	1957-
2N/13-28M(1)	Harvey Aluminum Co.	1957- 1/
2N/13-28N(1)	Harvey Aluminum Co.	1957-
2N/13-28P(1)	Harvey Aluminum Co.	1957-
2N/13-32A(1)	Chenowith Irrigation Coop.	1957- 1/
2N/13-32J(4)	Chenowith Irrigation Coop.	1957-
1/13-31Q(1)	Bill Hulse	1962-
4/13-9C(1)	E. J. Schilling	1962-

WASHINGTON COUNTY

WELL NO.	OWNER	RECORDS AVAILABLE
1N/1W-21L(1)	Cecil C. Schaefer	1964-
1N/2W-8E(1)	T. R. Connell	1951-
1N/2W-11C(2)	Albert Zander	1951-
1N/2W-35E(1)	E. L. Lewis	1951- 1/
1N/3W-15H(1)	Art Salswedel	1951-
1N/3W-19C(1)	A. J. Giesbere	1951-

LIST OF OBSERVATION WELLS

WELL NO.	OWNER	RECORDS AVAILABLE
1N/3W-36R(2)	Terminal Ice & Cold Storage Co.	1951- 1/
2N/2W-30D(1)	Felix Devlaeminck	1964-
2N/3W-16A(1)	Dennis Hall	1964-
2N/4W-24F(1)	Erwin Mead	1963-
2N/4W-33G(1)	Julius Winterfield	1963-
1/1W-11L(1)	City of Beaverton	1964-
1/1W-17P(1)	Schuepbach Brothers	1959- 1/
1/1W-19R(3)	Earle L. Miller	1961- 1/
1/1W-21R(1)	Elinore Shively	1948-
1/2W-13Q(1)	L. T. Wright	1961-
1/2W-23G(1)	Ed M. Jannsen	1965-
1/2W-24E(1)	Edward Berger	1957-
1/2W-26F(1)	Karl Schaefer	1958- 1/
1/2W-26G(1)	Baker Rock Crushing	1961-
1/2W-26Q(1)	Warren Northwest Inc.	1961-
1/2W-28A(1)	John Watts	1966-
1/3W-21C(2)	Ernest Meyer	1964-
1/4W-2H(1)	Myron Sheelar	1951- 1/
2/1W-3Q(1)	Leonard S. Davis	1962- 1/
2/1W-4C(2)	Harris H. Hanson	1962- 1/
2/1W-4G(1)	Tigard Water District	1962-
2/1W-10D(1)	Tigard Water District	1962-
2/1W-11E(1)	Tigard Water District	1962-
2/1W-11M(1)	Walter Engler	1962-
2/1W-13B(2)	Ralph Sittel	1960- 1/
2/1W-13K(2)	L. C. Endicott	1960-
2/1W-14N(1)	A. J. Martinazzi	1951-
2/1W-18J(1)	James Masuike	1962-
2/1W-31K(1)	Charles Kennerly	1963- 1/
2/1W-32F(3)	City of Sherwood	1963-
2/2W-2Q(1)	Louis Hesse	1965-
2/2W-6D(1)	S. R. Rotchstrom	1951- 1/
2/2W-16N(1)	Mountainside Cemetery	1964-1967 2/
WHEELER COUNTY		
12/23-14R(1)	Lillie Collins	1963-
YAMHILL COUNTY		
2/3W-30Q(1)	E. W. Leffler	1963-
2/4W-13G(1)	George Woell	1962-
3/2W-17A(1)	Mack Bennett	1962- 1/
3/2W-19N(1)	Valley View Memorial Park	1965-
3/3W-26G(1)	City of Dundee	1962-
3/3W-30J(2)	Trappist Abbey	1962-
3/4W-19N(1)	Austin Warner	1962-
4/3W-6N(1)	City of Lafayette	1962-
4/3W-33K(1)	Clayton J. Trent	1962- 1/
4/4W-24R(1)	Ross Cruickshank	1962-
4/4W-27D(1)	J. L. Wilcox	1962-
5/3W-9P(1)	Howard Baker	1962-
5/3W-21C(1)	Louie W. McGee	1962-
5/3W-21N(1)	Fred C. Stockhoff	1962-
5/3W-30R(1)	Barbara Fuqua (Rogers)	1962-
5/4W-1B(1)	Earle F. Day	1962-
5/4W-11D(1)	Norman J. Longhurst	1962- 1/
5/4W-20N(1)	City of Amity	1962-
5/4W-25G(1)	Peter Parvin	1962-
5/4W-27E(1)	Alf DeRaeve	1962-
5/5W-13B(1)	George Fuller	1928- 1/
6/3W-4D(1)	Lloyd L. Lind	1962-