

Water Right Conditions
Tracking Slip

Groundwater/Hydrology Section

FILE # # G-17497

ROUTED TO: WR

TOWNSHIP/
RANGE-SECTION: _____

CONDITIONS ATTACHED?: ☒ yes ☐ no

REMARKS OR FURTHER INSTRUCTIONS:

Reviewer: Gordon

WATER RESOURCES DEPARTMENT

MEMO

5 March 2012, 200

TO: Application G- 17497
FROM: GW: GERALD H. GRONDA
(Reviewer's Name)
SUBJECT: Scenic Waterway Interference Evaluation

☒ YES

The source of appropriation is within or above a Scenic Waterway

☐ NO

☒ YES

Use the Scenic Waterway condition (Condition 7J)

☐ NO

☒ Per ORS 390.835, the Ground Water Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

☐ Per ORS 390.835, the Ground Water Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in Klamath River Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

No net pumping given 100% of groundwater pumped will be re-injected

PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section Date 5 March 2012

FROM: Ground Water/Hydrology Section Gerald H. Grondin
Reviewer's Name

SUBJECT: Application G-17497 Supersedes review of _____
Date of Review(s) _____

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525. Department staff review ground water applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. This review is based upon available information and agency policies in place at the time of evaluation.*

A. GENERAL INFORMATION: Applicant's Name: Klamath County School District County: Klamath

A1. Applicant(s) seek(s) 0.89 (400 gpm) cfs from one production well and one injection well well(s) in the Klamath Basin, in the Lost River sub basin Quad Map: Merrill

A2. Proposed use: Heat Exchange Seasonality: Year Round (365 days)

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

Well #	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	KLAM 57529	1	Basalt	+0.89	41S/11E-sec 10 DAA	165' S, 485' W fr E qtr cor S 10
2	Not drilled	2	Basalt	-0.89	41S/11E-sec 10 DAD	740' S, 620' W fr E qtr cor S 10
3						
4						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	4060	92	66	07/19/10	303	0-202	+2.5-202	193-303	240-303	245	5	P
2	4056	?	?	None	300	?	?	?	?	400?	?	?

Use data from application for proposed wells.

A4. Comments: _____

Proposed groundwater use is for heat exchange for heating and cooling the school.

The proposed pumping rate is based upon the total proposed annual volume of 645 acre-feet. This volume converts to 0.89 cfs (400 gpm) for continuous pumping.

Owner well 1 (KLAM 57529) is currently used as an exempt well supplying water to the school up to 15,000 gallons per day. This application proposes to additionally use the well for groundwater production for heat exchange. Based on the water well report, the well obtains groundwater from the predominant basalt unit below the basin-fill sediments.

Owner well 2 is not drilled yet. The proposed construction is similar to the production well. This implies the injection well should return groundwater to the same or nearby water bearing zone in the predominant basalt unit after the heat exchange.

- A5. ☐ Provisions of the N.A. Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water ☐ are, or ☐ are not, activated by this application. (Not all basin rules contain such provisions.)

Comments: _____

No basin rule applies. Only the Klamath River Compact ORS 542.610 to 542.630 applies to the Klamath Basin. However, that compact applies to surface water only, not ground water.

- A6. ☐ Well(s) # N.A., _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: _____

Comments: _____

Currently, there is no administrative area.

However, this is the Merrill-Malin area where no additional groundwater use should occur. Additional groundwater use (net increase in groundwater pumping) would add to ongoing groundwater level declines in the area that has increased significantly since 2000. As a result, OWRD finds groundwater is no longer available for additional use that increases the amount of net groundwater pumping in the area.

This application proposes no additional (net increase) groundwater use, because it proposes to inject 100 percent of the water pumped after it has passed through the heat exchange. To ensure this occurs, no net groundwater use must be included as a permit condition where 100% of the groundwater extracted must be injected to the same water bearing zone.

B. GROUND WATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070B1. Based upon available data, I have determined that ground water* for the proposed use:

- a. ☒ is over appropriated, ☐ is not over appropriated, or ☐ cannot be determined to be over appropriated during any period of the proposed use. * This finding is limited to the ground water portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. ☐ will not or ☐ will likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the ground water portion of the injury determination as prescribed in OAR 690-310-130;
- c. ☐ will not or ☐ will likely to be available within the capacity of the ground water resource; or
- d. ☐ will, if properly conditioned, avoid injury to existing ground water rights or to the ground water resource:
- ☐ The permit should contain condition #(s) _____
 - ☐ The permit should be conditioned as indicated in item 2 below.
 - ☐ The permit should contain special condition(s) as indicated in item 3 below;

- B2. a. ☐ Condition to allow ground water production from no deeper than _____ ft. below land surface;
- b. ☐ Condition to allow ground water production from no shallower than _____ ft. below land surface;
- c. ☐ Condition to allow ground water production only from the _____ ground water reservoir between approximately _____ ft. and _____ ft. below land surface;
- d. ☐ Well reconstruction is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Ground Water Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. Ground water availability remarks: _____

Groundwater in the Merrill-Malin area is determined to be over appropriated (see paragraph below). No additional (net increase) groundwater use should occur. This application does not propose any additional (net increase) groundwater use.

Long term state observation well groundwater level data related to state observation wells 293 (KLAM 14914), 334 (KLAM 14764), and 1358 (KLAM 52194) show climatic influences. Additionally, these and the City of Merrill well (KLAM 14959) and California well 48N04E16M001M (TID well #3) and well 48N03E14M001M clearly show a significant decline that began after the 1990s when comparing annual peak water levels. The hydrograph for each well is attached. The total decline in the area ranges from 15 to 30 feet. A map showing the 2010 seasonal decline and a map showing the total decline from spring 2001 to spring 2011 are attached. These are consistent with and update what was reported by Gannett and others (2007) and the USGS (2005). The declines are greater than typically observed during drought periods. They appear related to the USBOR Klamath Project Water Bank. Any additional (net increase) groundwater use in the Merrill-Malin area risks increasing the decline rate. This application does not propose any additional (net increase) groundwater use.

This is the Merrill-Malin area where no additional groundwater use should occur. Additional groundwater use (net increase in groundwater pumping) would add to ongoing groundwater level declines in the area that has increased significantly since 2000. As a result, OWRD finds groundwater is no longer available for additional use that increases the amount of net groundwater pumping in the area. This application proposes no additional (net increase) groundwater use.

This application proposes no additional (net increase) groundwater use, because it proposes to inject 100 percent of the water pumped after it has passed through the heat exchange. To ensure this occurs, no net groundwater use must be included as a permit condition where 100% of the groundwater extracted must be injected to the same water bearing zone (see below).

If a permit is issued, the following conditions should be included: 7B, 7F, 7L, 7N (modified), 7T (measuring tube for each well), the "large" water use condition (flow meter required at each well), and special conditions (see below):

7N, the measurement condition modified (change part "A" from three to "one or more feet", merge "B" and "C" to read "Annual water-level measurements reveal a water-level decline of 5 or more feet:", and change part "D" from 25 to "10 or more feet", and add a part "E" to read "OWRD groundwater section staff approved static ground water level measurements at well KLAM 53269 (Loren Kandra) near Adams Point is below 55 feet below land surface", and insert the following to the last paragraph after "no action is necessary because...": insert "...the use is not contributing to the decline or contributing to the groundwater level being below 55 feet below land surface at well KLAM 53269 or because...").

7T, the measuring tube condition modified (add "For existing wells with a pump installed, installation of the measuring tube shall occur when the pump is removed or replaced and/or when the well is deepened or reconstructed or altered.").

The "large" water use condition (require a flow meter at each well; each flow meter shall be located within 50 feet of the wellhead (the meter at the production well must be before the line split that directs water to the heat exchange versus to the school's exempt uses. Also require a flow meter at the beginning and end of the heat exchange unit and on the school exempt use line located after the line split to the heat exchange unit and before the first location of the school's exempt use. Adjacent to every flow meter shall be a clearly visible monument with a sign noting the flow meter. Lastly, require for every flow meter the reading, recording (monthly at minimum), and annual reporting of the flow meter data, all flow meters).

Well construction condition ("All wells shall be constructed to extract or inject groundwater from and to the same or adjoining water-bearing zone within the basalt unit below the basin sediments. To meet this criterion, each well shall have at minimum continuous casing and continuous seal from land surface, through the sediment to the productive portion of the basalt unit. Additionally, there shall be no more than 100 feet difference when comparing the well bottom elevation for any two of the permitted wells").

Special condition for no net groundwater use: "This permit is valid if and only if 100 percent of the groundwater extracted from the production well(s) is injected in the authorized injection well(s) which can be confirmed by flow meter data. Otherwise, the use is invalid and subject to regulation, including possible immediate cancellation of the permit."

Special condition for low temperature geothermal wells used for heating: "All water produced under this permit shall be injected into the authorized well(s). Prior to receiving a certificate of water right, the permit holder shall submit documentation affirming that any applicable additional requirements of the Department's Division 230 rules have been met."

Special Condition for groundwater production: "Groundwater production shall occur from the predominant basalt unit below the predominant basin fill unit by casing and sealing through the basin fill unit into the basalt unit."

C. GROUND WATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040**C1. 690-09-040 (1): Evaluation of aquifer confinement:**

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	Basalt Unit	☐	☒
2	Basalt Unit	☐	☒
		☐	☐

Basis for aquifer confinement evaluation: _____

System is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. Generally, low transmissivity (low permeability) sediment of varying thickness overlies high transmissivity (high permeability) basalt. Groundwater occurs in both the sediment unit and the basalt unit. Groundwater is vertically connected within each unit and between each unit. This is based upon investigations by Gannett and others (2007) and Grondin (2004).

Water well reports (well logs) for wells in the general area indicate the sediment thickness varies considerably. For example, the sediment thickness at the Lost River High School well (KLAM 57529) is less than 180 feet, but it is more than 1,100 feet at TID well #3 (CALIF 48N04E16M001M) located about 1.7 miles to the southwest of the school well.

- C2. 690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Lost River	4010	4035	8100	☒	☐	☐	☐	☒
2	1	Lost River	4010	4035	7575	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: _____

The groundwater elevation in the table above is based on state observation well data. It is not appropriate to use the static water level data on the water well report (well log) for the proposed production well (KLAM 57529), because that measurement occurred during the summer of 2010, the time of greatest drought related groundwater pumping and greatest seasonal groundwater level drawdown.

The distance from the wells to the Lost River is to the nearest reach.

OWRD water availability data indicates the Lost River gains water between Olene Gap and the Oregon-California boundary. Currently, the river reach closest to the proposed wells appears to be losing water to groundwater given the river stage is above the static groundwater elevation. State observation well data indicates groundwater levels in the Merrill-Malin area have declined up to 30 feet. So historically, the groundwater level at the proposed production well (KLAM 57529) and the proposed injection well was above the river stage at the nearest river reach and the river gained water from groundwater. Now, the groundwater hydraulic connection with the Lost River (groundwater elevation occurring above the river stage) occurs not at the nearest river reach, but much further away northwest of Merrill.

The eastern Lost River sub-basin ground water investigation data (Grondin, 2004) and the current USGS-OWRD cooperative Upper Klamath Basin ground water investigation (Gannett and others, 2007) indicate low yield (low hydraulic conductivity) sediments overlie higher yield (high conductivity) basalt. Many domestic wells produce from the sediments and most irrigation wells produce from the basalt. Ground water in the sediments and the basalt appear hydraulically connected. The data include similar or small differences between basalt and sedimentary ground water levels and data showing ground water levels at wells completed in the sediments responding to pumping ground water from basalt.

Water Availability Basin the well(s) are located within: LOST R > TULE L – AT STATE LINE

- | Well | SW # | Well < 1/4 mile? | Qw > 5 cfs? | Instream Water Right ID | Instream Water Right Q (cfs) | Qw > 1% ISWR? | 80% Natural Flow (cfs) | Qw > 1% of 80% Natural Flow? | Interference @ 30 days (%) | Potential for Subst. Interfer. Assumed? |
|------|------|--------------------------|--------------------------|-------------------------|------------------------------|--------------------------|------------------------|------------------------------|----------------------------|---|
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |

- | | SW # | | Qw > 5 cfs? | Instream Water Right ID | Instream Water Right Q (cfs) | Qw > 1% ISWR? | 80% Natural Flow (cfs) | Qw > 1% of 80% Natural Flow? | Interference @ 30 days (%) | Potential for Subst. Interfer. Assumed? |
|--|------|--|--------------------------|-------------------------|------------------------------|--------------------------|------------------------|------------------------------|----------------------------|---|
| | | | ☐ | | | ☐ | | ☐ | | ☐ |
| | | | ☐ | | | ☐ | | ☐ | | ☐ |
| | | | ☐ | | | ☐ | | ☐ | | ☐ |
| | | | ☐ | | | ☐ | | ☐ | | ☐ |

All the proposed wells are more than 1.00 mile from the Lost River.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)													
(E) = (A / B) x 100													

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: _____

All the proposed wells are more than 1.00 mile from the Lost River.

The application proposes and this review is based upon no net use of groundwater (net use = 0.0 gpm) where 100 percent of the groundwater extracted is injected back to the same source. So no calculation was conducted. If less than 100 percent of the groundwater extracted is injected to the same source, this review is invalid and the permit should not be issued.

C4b. 690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.

- C5. ☐ If properly conditioned, the surface water source(s) can be adequately protected from interference, and/or ground water use under this permit can be regulated if it is found to substantially interfere with surface water:
- i. ☐ The permit should contain condition #(s) _____;
 - ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. SW / GW Remarks and Conditions _____

This review is based upon no net use of groundwater (net use = 0.0 gpm) where 100 percent of the groundwater extracted is injected back to the same source. If the capability or the intent is for less than 100 percent of the groundwater extracted to be injected to the same source, this review is invalid and the permit should not be issued.

Groundwater in the Merrill-Malin area is determined to be over appropriated (see paragraph below). No additional (net increase) groundwater use should occur. This application does not propose any additional (net increase) groundwater use.

Long term state observation well groundwater level data related to state observation wells 293 (KLAM 14914), 334 (KLAM 14764), and 1358 (KLAM 52194) show climatic influences. Additionally, these and the City of Merrill well (KLAM 14959) and California well 48N04E16M001M (TID well #3) and well 48N03E14M001M clearly show a significant decline that began after the 1990s when comparing annual peak water levels. The hydrograph for each well is attached. The total decline in the area ranges from 15 to 30 feet. A map showing the 2010 seasonal decline and a map showing the total decline from spring 2001 to spring 2011 are attached. These are consistent with and update what was reported by Gannett and others (2007) and the USGS (2005). The declines are greater than typically observed during drought periods. They appear related to the USBOR Klamath Project Water Bank. Any additional (net increase) groundwater use in the Merrill-Malin area risks increasing the decline rate. **This application does not propose any additional (net increase) groundwater use.**

This is the Merrill-Malin area where no additional groundwater use should occur. Additional groundwater use (net increase in groundwater pumping) would add to ongoing groundwater level declines in the area that has increased significantly since 2000. As a result, OWRD finds groundwater is no longer available for additional use that increases the amount of net groundwater pumping in the area. **This application proposes no additional (net increase) groundwater use.**

This application proposes no additional (net increase) groundwater use, because it proposes to inject 100 percent of the water pumped after it has passed through the heat exchange. To ensure this occurs, no net groundwater use must be included as a permit condition where 100% of the groundwater extracted must be injected to the same water bearing zone (see below).

If a permit is issued, the following conditions should be included: 7B, 7F, 7L, 7N (modified), 7T (measuring tube for each well), the "large" water use condition (flow meter required at each well), and special conditions (see below):

7N, the measurement condition modified (change part "A" from three to "one or more feet", merge "B" and "C" to read "Annual water-level measurements reveal a water-level decline of 5 or more feet:", and change part "D" from 25 to "10 or more feet", and add a part "E" to read "OWRD groundwater section staff approved static ground water level measurements at well KLAM 53269 (Loren Kandra) near Adams Point is below 55 feet below land surface", and insert the following to the last paragraph after "no action is necessary because...": insert "...the use is not contributing to the decline or contributing to the groundwater level being below 55 feet below land surface at well KLAM 53269 or because...").

7T, the measuring tube condition modified (add "For existing wells with a pump installed, installation of the measuring tube shall occur when the pump is removed or replaced and/or when the well is deepened or reconstructed or altered.").

Continues on next page

The "large" water use condition (require a flow meter at each well; each flow meter shall be located within 50 feet of the wellhead (the meter at the production well must be before the line split that directs water to the heat exchange versus to the school's exempt uses. Also require a flow meter at the beginning and end of the heat exchange unit and on the school exempt use line located after the line split to the heat exchange unit and before the first location of the school's exempt use. Adjacent to every flow meter shall be a clearly visible monument with a sign noting the flow meter. Lastly, require for every flow meter the reading, recording (monthly at minimum), and annual reporting of the flow meter data, all flow meters).

Well construction condition ("All wells shall be constructed to extract or inject groundwater from and to the same or adjoining water-bearing zone within the basalt unit below the basin sediments. To meet this criterion, each well shall have at minimum continuous casing and continuous seal from land surface, through the sediment to the productive portion of the basalt unit. Additionally, there shall be no more than 100 feet difference when comparing the well bottom elevation for any two of the permitted wells").

Special condition for no net groundwater use: "This permit is valid if and only if 100 percent of the groundwater extracted from the production well(s) is injected in the authorized injection well(s) which can be confirmed by flow meter data. Otherwise, the use is invalid and subject to regulation, including possible immediate cancellation of the permit."

Special condition for low temperature geothermal wells used for heating: "All water produced under this permit shall be injected into the authorized well(s). Prior to receiving a certificate of water right, the permit holder shall submit documentation affirming that any applicable additional requirements of the Department's Division 230 rules have been met."

Special Condition for groundwater production: "Groundwater production shall occur from the predominant basalt unit below the predominant basin fill unit by casing and sealing through the basin fill unit into the basalt unit."

References Used:

Grondin, G.H., 2004. Ground Water in the Eastern Lost River Sub-Basin, Langell, Yonna, Swan Lake, and Poe Valleys of Southeastern Klamath County, Oregon. Ground Water Report 41, Oregon Water Resources Department, Salem, Oregon.

USGS, 2005. Assessment of the Klamath Project pilot water bank: a review from a hydrologic perspective. Prepared by the U.S. Geological Survey Oregon Water Science Center, Portland, Oregon for the U.S. Bureau of Reclamation Klamath Basin Area Office, Klamath Falls, Oregon, May 3, 2005.

Gannett, M.W., Lite, K.E., La Marche, J.L., Fisher, B.J., and Polette, D.J. 2007. Ground-Water Hydrology of the Upper Klamath Basin, Oregon and California. USGS Scientific Investigations Report 2007-5050.

Sammel, E.A. 1980. Hydrogeologic Appraisal of the Klamath Falls Geothermal Area, Oregon. USGS Professional Paper 1044-G, 45 p.

Leonard, A.R. and Harris, A.B. 1974. Groundwater in selected areas in the Klamath Basin, Oregon. OWRD Groundwater Report No. 21, 104 pgs.

Hydrographs and/or water well reports for wells KLAM 57529, KLAM 53269, KLAM 14914, KLAM 14764, KLAM 52194, KLAM 14959, California well 48N04E16M001M (TID well #3), and California well 48N03E14M001M.

USGS Merrill and Malin quadrangle maps (1:24,000 scale)

D. WELL CONSTRUCTION, OAR 690-200D1. Well #: 1 Logid: KLAM 57529D2. **THE WELL does not meet current well construction standards based upon:**

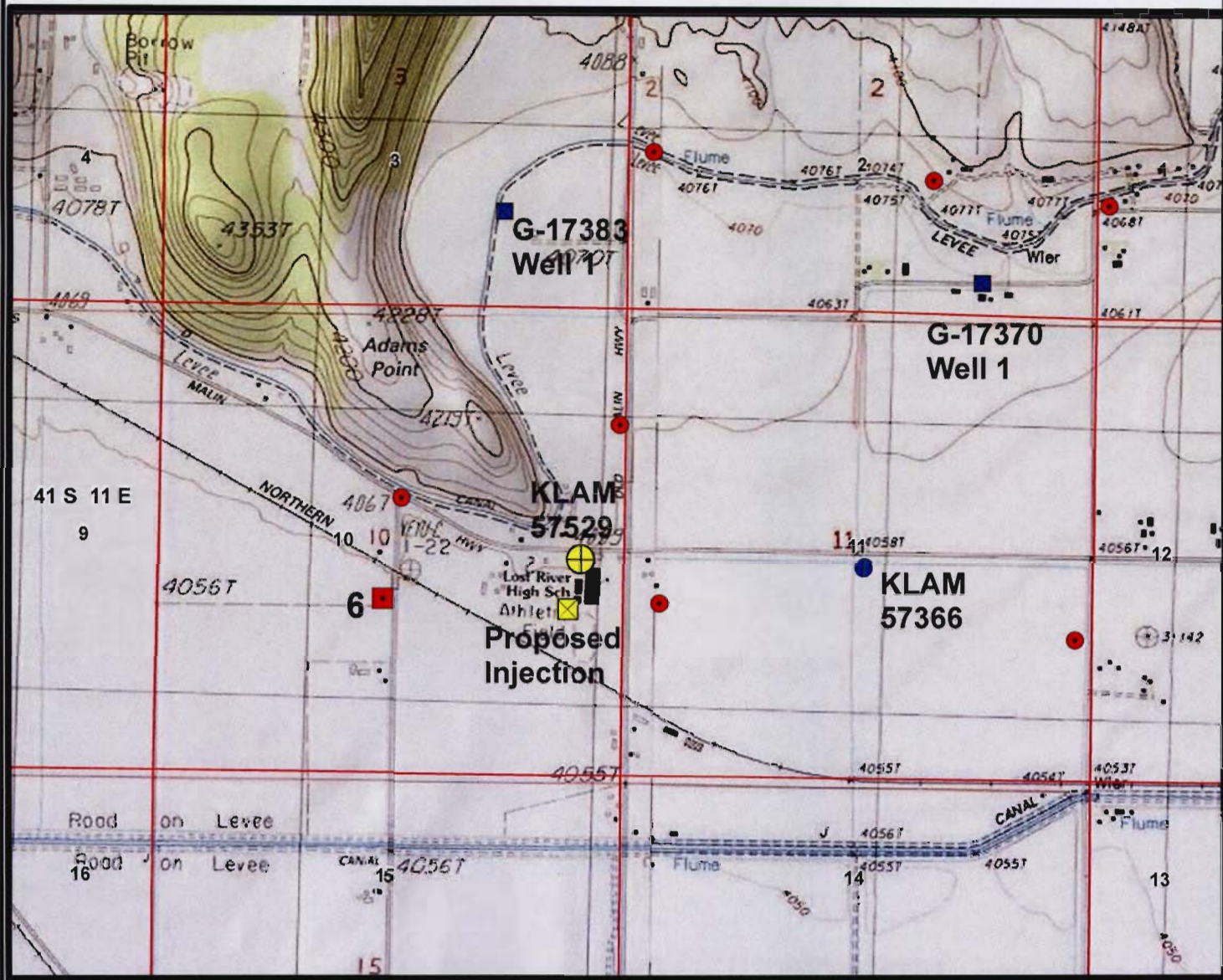
- a. ☐ review of the well log;
b. ☐ field inspection by _____;
c. ☐ report of CWRE _____;
d. ☐ other: (specify) _____

D3. **THE WELL construction deficiency:**

- a. ☐ constitutes a health threat under Division 200 rules;
b. ☐ commingles water from more than one ground water reservoir;
c. ☐ permits the loss of artesian head;
d. ☐ permits the de-watering of one or more ground water reservoirs;
e. ☐ other: (specify) _____

D4. **THE WELL construction deficiency is described as follows:** _____D5. **THE WELL** a. ☒ was, or ☐ was not constructed according to the standards in effect at the time of original construction or most recent modification.b. ☐ I don't know if it met standards at the time of construction.**The well meets the recommended permit conditions for well construction and groundwater production.**D6. ☐ **Route to the Enforcement Section.** I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Enforcement Section and the Ground Water Section.**THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL**D7. ☐ Well construction deficiency has been corrected by the following actions: __________, 200_____
(Enforcement Section Signature)D8. ☐ **Route to Water Rights Section (attach well reconstruction logs to this page).**

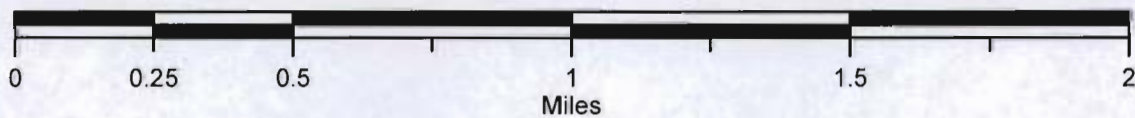
Permit Application G-17497 Klamath County School District



Yellow = Proposed POA
Red & Blue = Other Wells

Green = Surface Water Rights

Permit Application G-17497 Klamath County School District



Yellow = Proposed POA
Red & Blue = Other Wells

Green = Surface Water Rights

STATE OF OREGON

WATER SUPPLY WELL REPORT

(as required by ORS 537.765 & OAR 690-205-0210)

09-16-2010

WELL LABEL # L 100398

START CARD # 1010639

(1) LAND OWNER Owner Well I.D. #2

First Name _____ Last Name _____

Company KLAMATH COUNTY SCHOOL DISTRICT

Address 10501 WASHBURN WAY

City KLAMATH FALLS State OR Zip 97603

(2) TYPE OF WORK ☒ New Well ☐ Deepening ☐ Conversion

☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD

☒ Rotary Air ☒ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud

☐ Reverse Rotary ☐ Other _____

(4) PROPOSED USE ☐ Domestic ☐ Irrigation ☐ Community

☐ Industrial/ Commercial ☐ Livestock ☐ Dewatering

☐ Thermal ☐ Injection ☒ Other MUNICIPAL

(5) BORE HOLE CONSTRUCTION Special Standard ☐ Attach copy

Depth of Completed Well 303.00 ft.

BORE HOLE			SEAL			Amt	lbs
Dia	From	To	Material	From	To		
14.75	0	202	Bentonite Chips	0	6	7	S
9.87	202	303	Cement	6	202	115	S

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other _____

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

Explosives used: ☐ Yes Type _____ Amount _____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
☒	☒	10		2.5	202	.250	☒	☐	☒	☐
☐	☐	8		193	303	.188	☒	☐	☒	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s) _____

Temp casing ☐ Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS

Perforations Method Factory Saw

Screens Type _____ Material _____

Perf/S	Casing/Screen	Liner	Dia	From	To	Scr/slot width	Slot length	# of slots	Tele/ pipe size
Perf	Liner	8	240	303	125	3	1.008		

(8) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
245	5	150	24

Temperature 64 °F Lab analysis ☒ Yes By _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County Klamath Twp 41.00 S N/S Range 11.00 E E/W WM

Sec 10 SW 1/4 of the SE 1/4 Tax Lot 100

Tax Map Number _____ Lot _____

Lat _____ " or _____ DMS or DD

Long _____ " or _____ DMS or DD

☒ Street address of well ☐ Nearest address

23330 HIGHWAY 50, MERRILL, OREGON 97633

(10) STATIC WATER LEVEL

Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			
Completed Well	<u>07-21-2010</u>		<u>66</u>

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES

Depth water was first found 92

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
07-14-2010	92	131	200			92
07-16-2010	172	192	500			92
07-19-2010	211	303	500			66

(11) WELL LOG

Ground Elevation _____

Material	From	To
Soft Sandy Loam	0	21
Redish Claystone	21	25
Tan & Yellow Clayston	25	84
Broken Rubble Ash & Cinders	84	104
Claystone & Shale Layers Mixed Green & Tan	104	172
Weathered Brown Rock	172	176
Black Basalt	176	179
Softer Brown Rock Decomposed	179	192
Hard Black Basalt	192	211
Softer Black Basalt with Brown Ash & Cinders	211	228
Basalt with Rubble & Shale Strips	228	247
Gray & Green Siltstone	247	286
Hard Broken Basalt	286	291
Broken Gray & Brown Basalt	291	303

Date Started 07-13-2010 Completed 07-23-2010

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____

Electronically Filed

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1385 Date 09-16-2010

Electronically Filed

Signed ROBERT BUCKNER (E-filed)

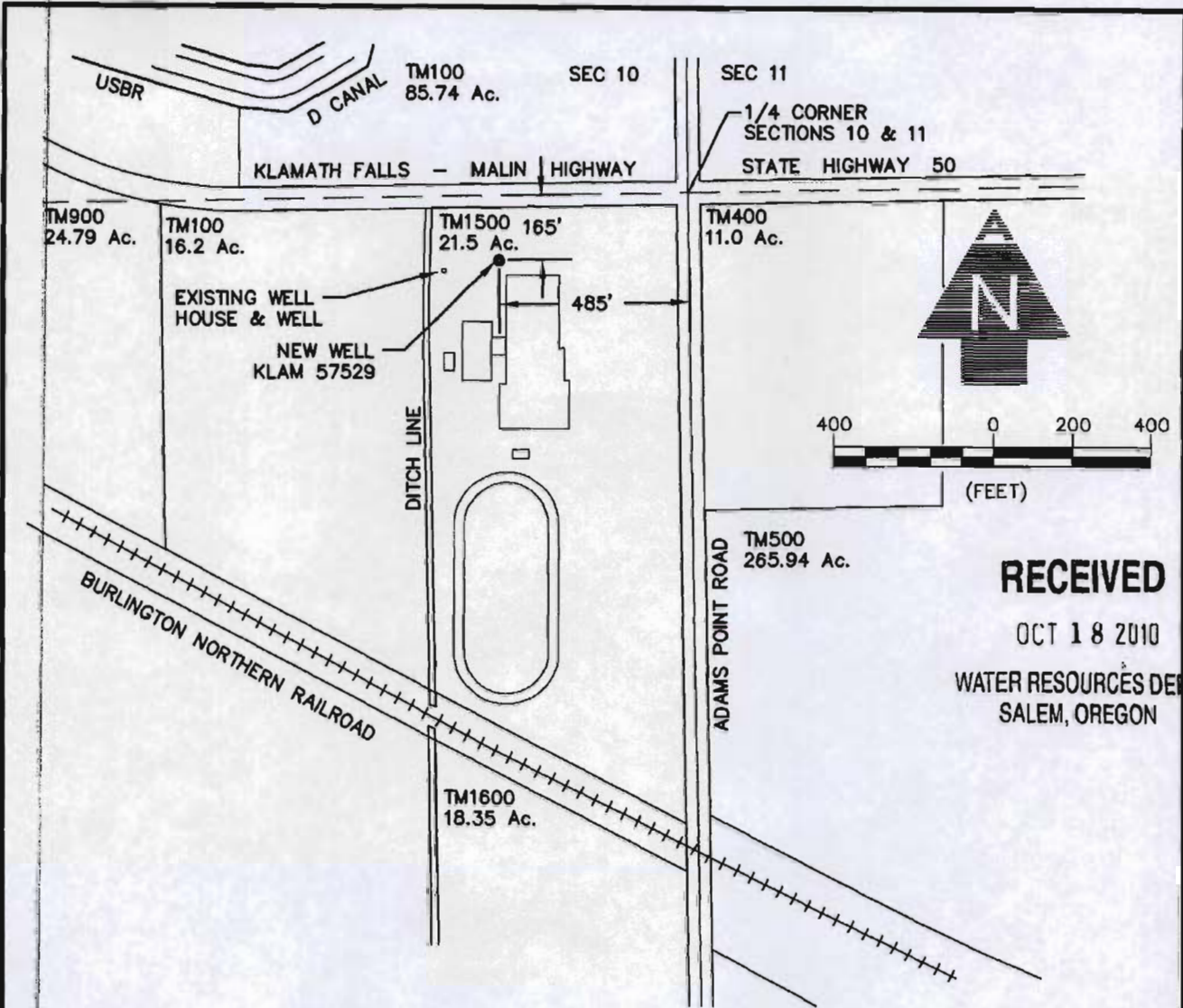
Contact Info (optional) _____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.95

KLAM 57529



RECEIVED

OCT 18 2010

WATER RESOURCES DEPT
SALEM, OREGON

COUNTY ACCESSOR MAP: 41S 11E 10 W.M.
STREET ADDRESS OF WELL: 23330 HIGHWAY 50, MALIN, OREGON

WELL I.D. No.: KLAM 57529
WELL LABEL No.: L100398
START CARD: 1010639

ADKINS
SINCE 1983

CONSULTING
ENGINEERS, INC.

Engineers ▲ Planners ▲ Surveyors

2950 Shasta Way - Klamath Falls, Oregon 97603 - (541) 884-4666 - FAX (541) 884-5335
Klamath Falls, OR - Medford, OR - Alturas, CA

10/8/10

Base

1122-27

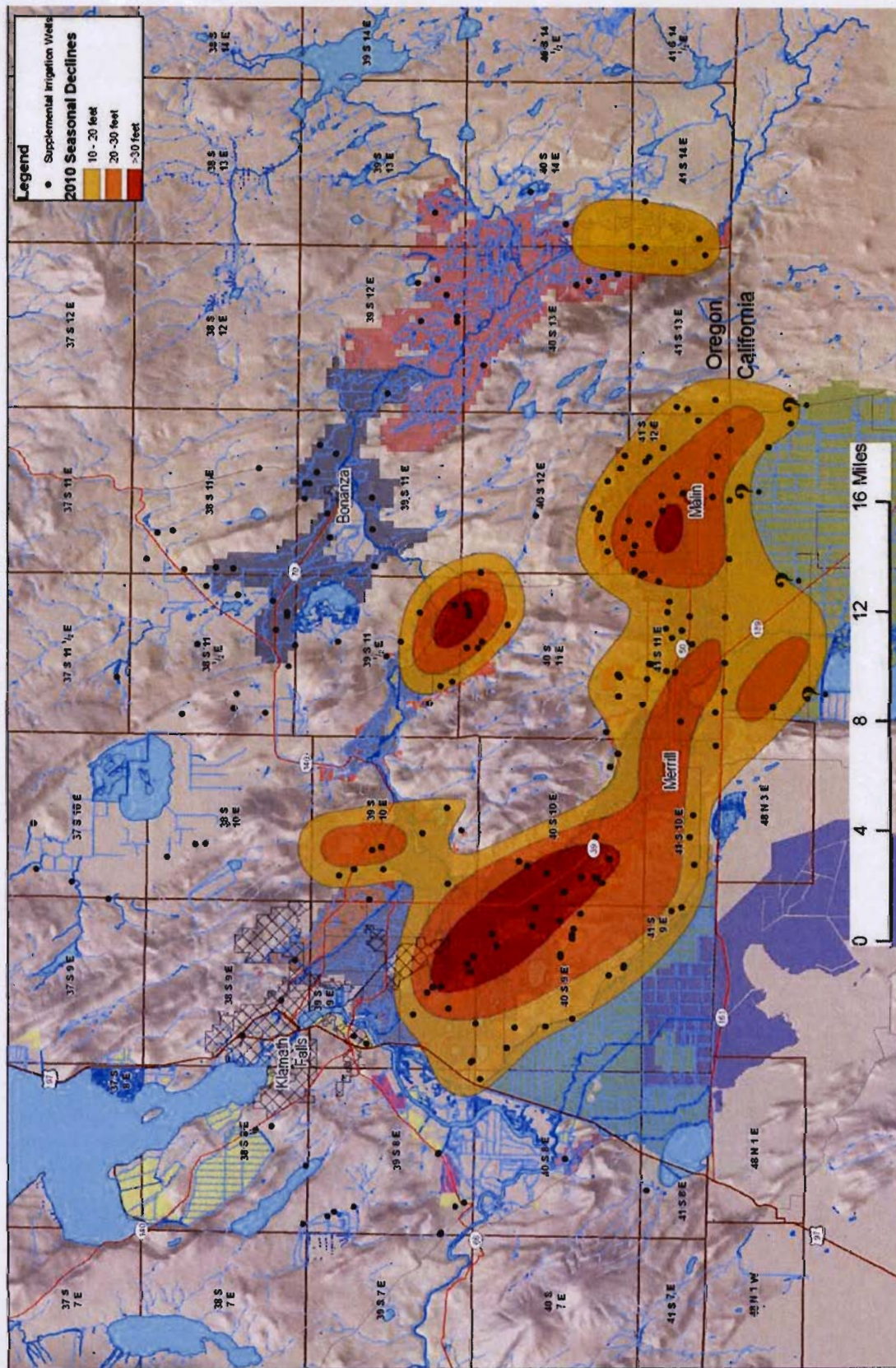
WELL LOCATION MAP
FOR

LOST RIVER HIGH SCHOOL

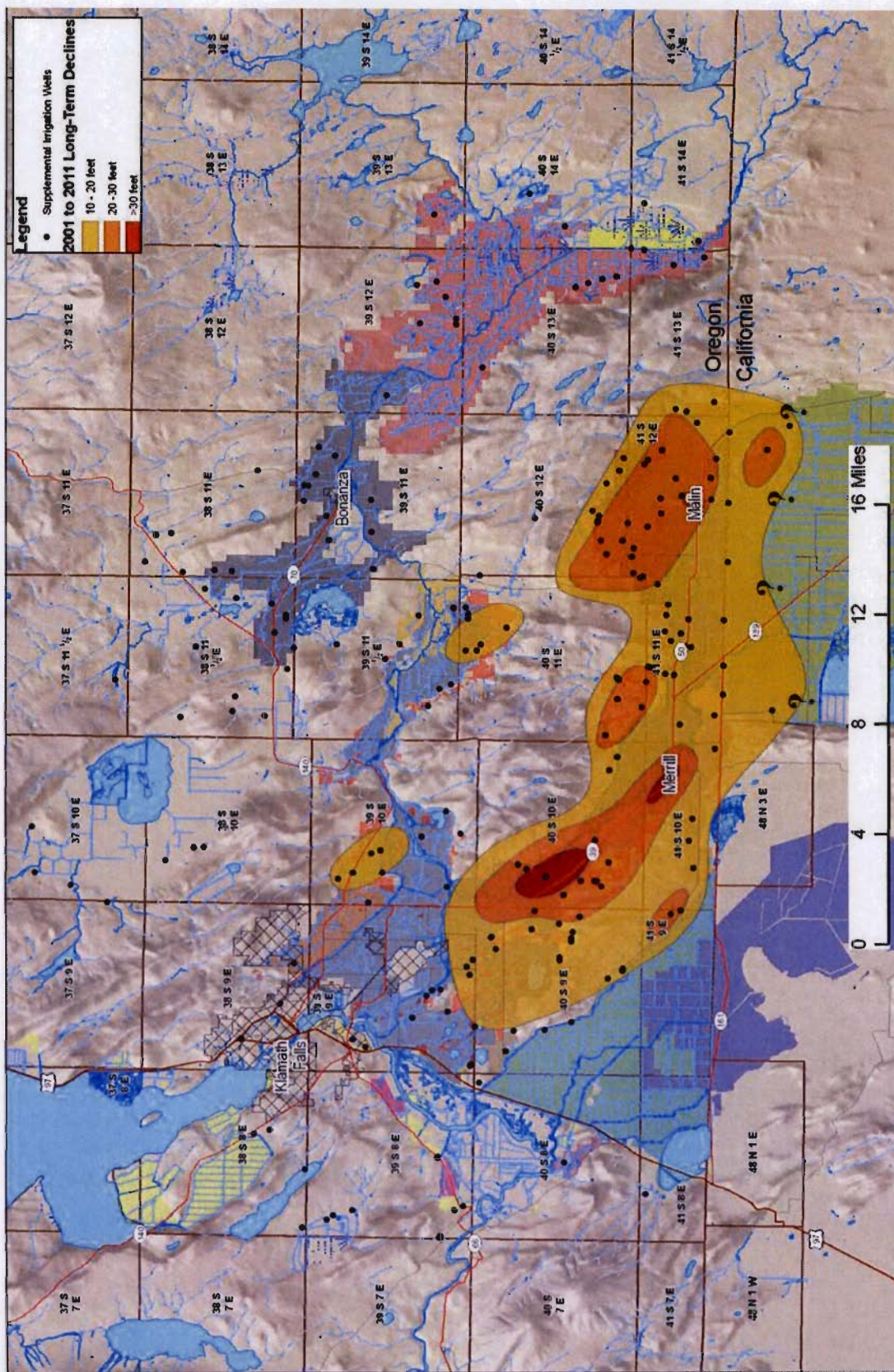
KLAMATH COUNTY SCHOOL DISTRICT

KLAMATH COUNTY, OREGON

LAND OWNER SUBMITTED MAP



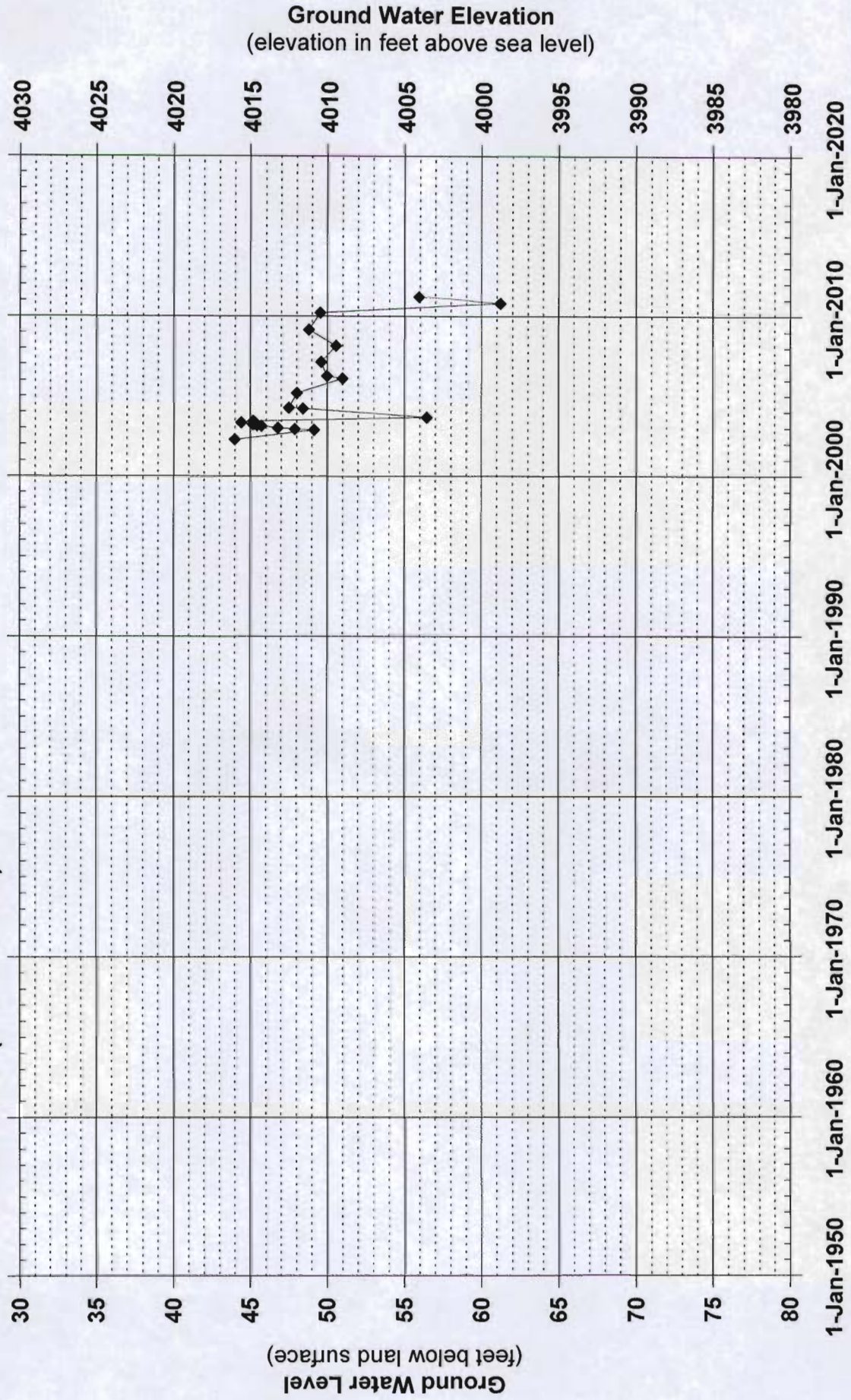
The magnitude and distribution of seasonal groundwater-level declines observed between spring and fall 2010. The shading indicates the maximum declines within a given area. Many wells showed smaller declines, particularly shallow wells more directly influenced by surface water.



The magnitude and distribution of groundwater-level declines observed between spring 2001 and spring 2011. The shading indicates the maximum declines within a given area. Many wells showed smaller declines, particularly shallow wells more directly influenced by surface water.

KLAM 53269
State Observation Well N.A.
T41S/R11E-sec 10 and
Merrill-Malin (Adams Point)

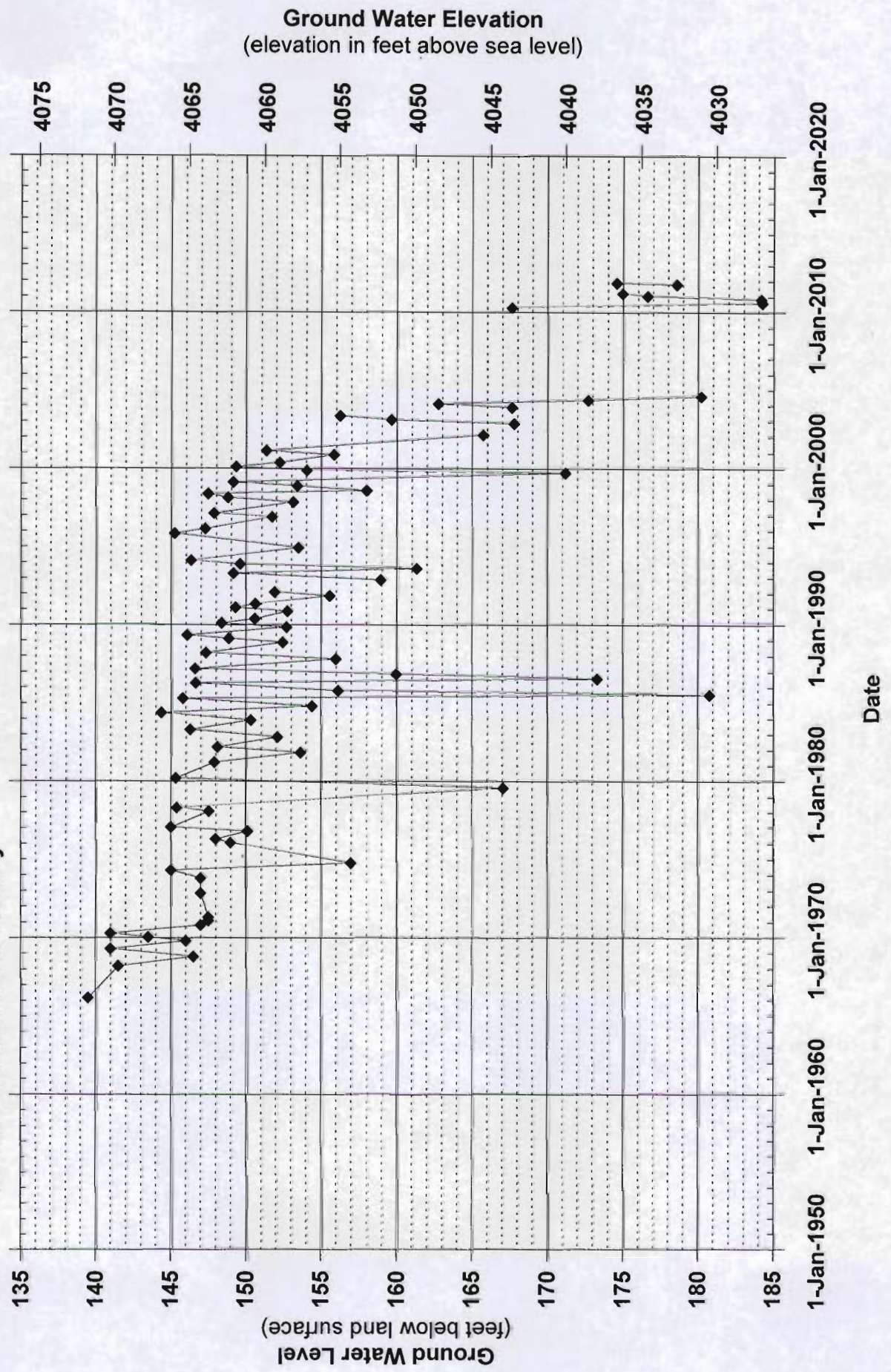
Well Depth = 271 ft
 Casing Depth = 175 ft
 Seal Depth = 175 ft
 Aquifer = Basalt



Date

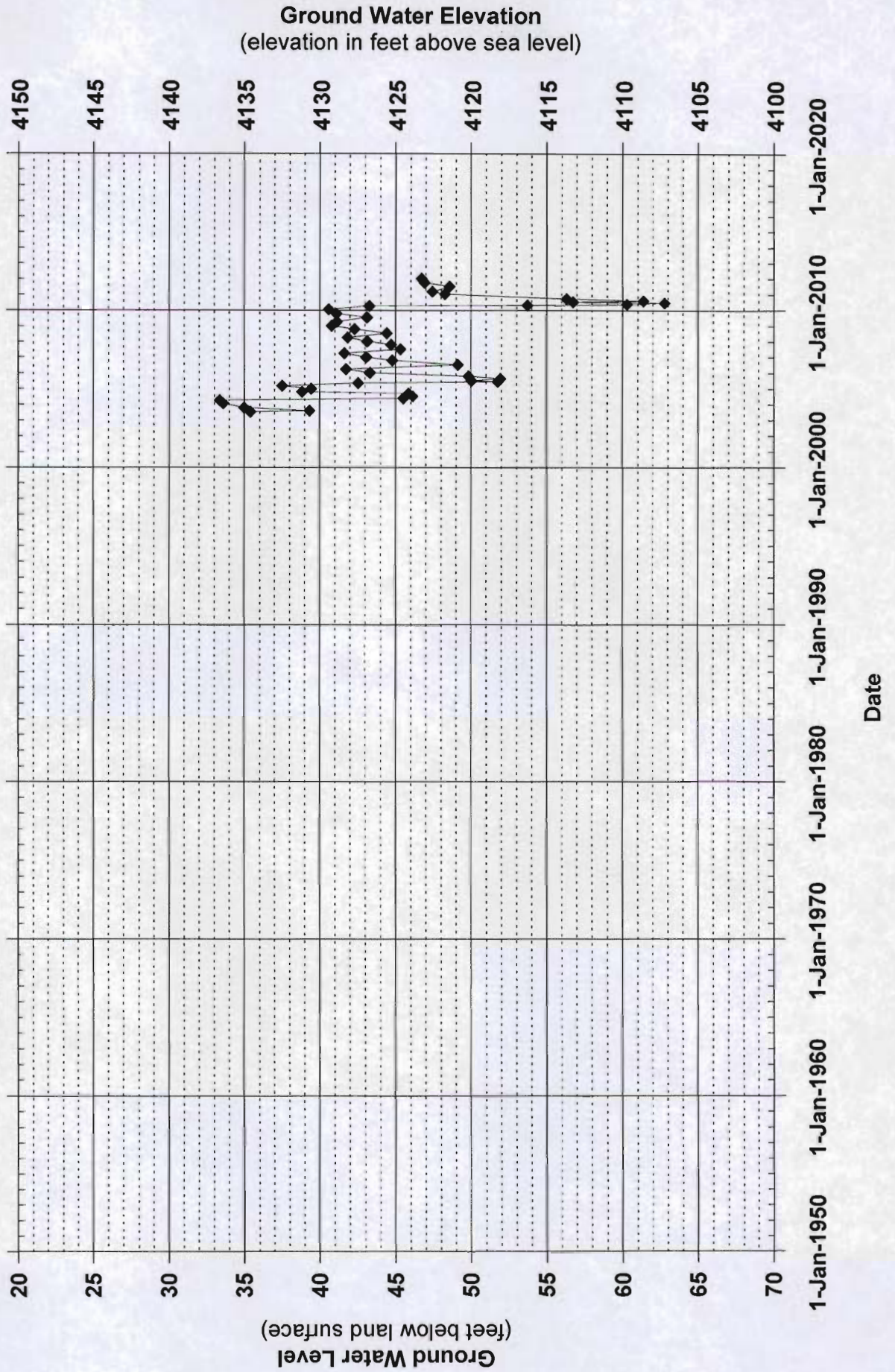
KLAM 14914
State Observation Well 293
T41S/R09E-sec 12 aab
South Klamath Hills Vicinity

Well Depth = 888 ft
 Casing Depth = 40 ft
 Seal Depth = 38 ft
 Aquifer = Basalt



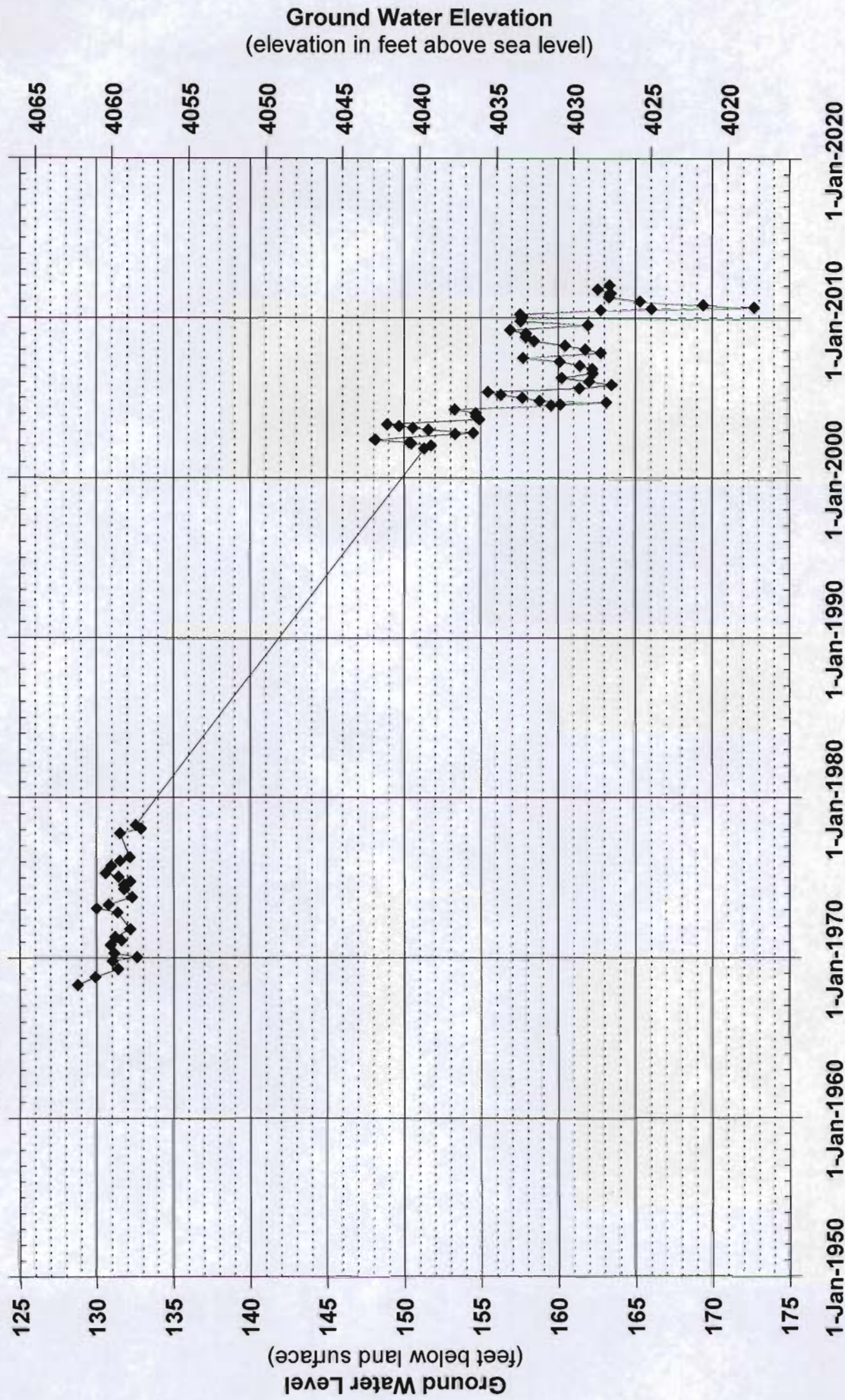
KLAM 12925
State Observation Well N.A.
T39S/R10E-sec 08 cad
Pine Grove

Well Depth = 508 ft
 Casing Depth = 79 ft
 Seal Depth = 77 ft
 Aquifer = Basalt



KLAM 14764
 State Observation Well 334
 T40S/R11E-sec 29 acb
 Dodds Hollow

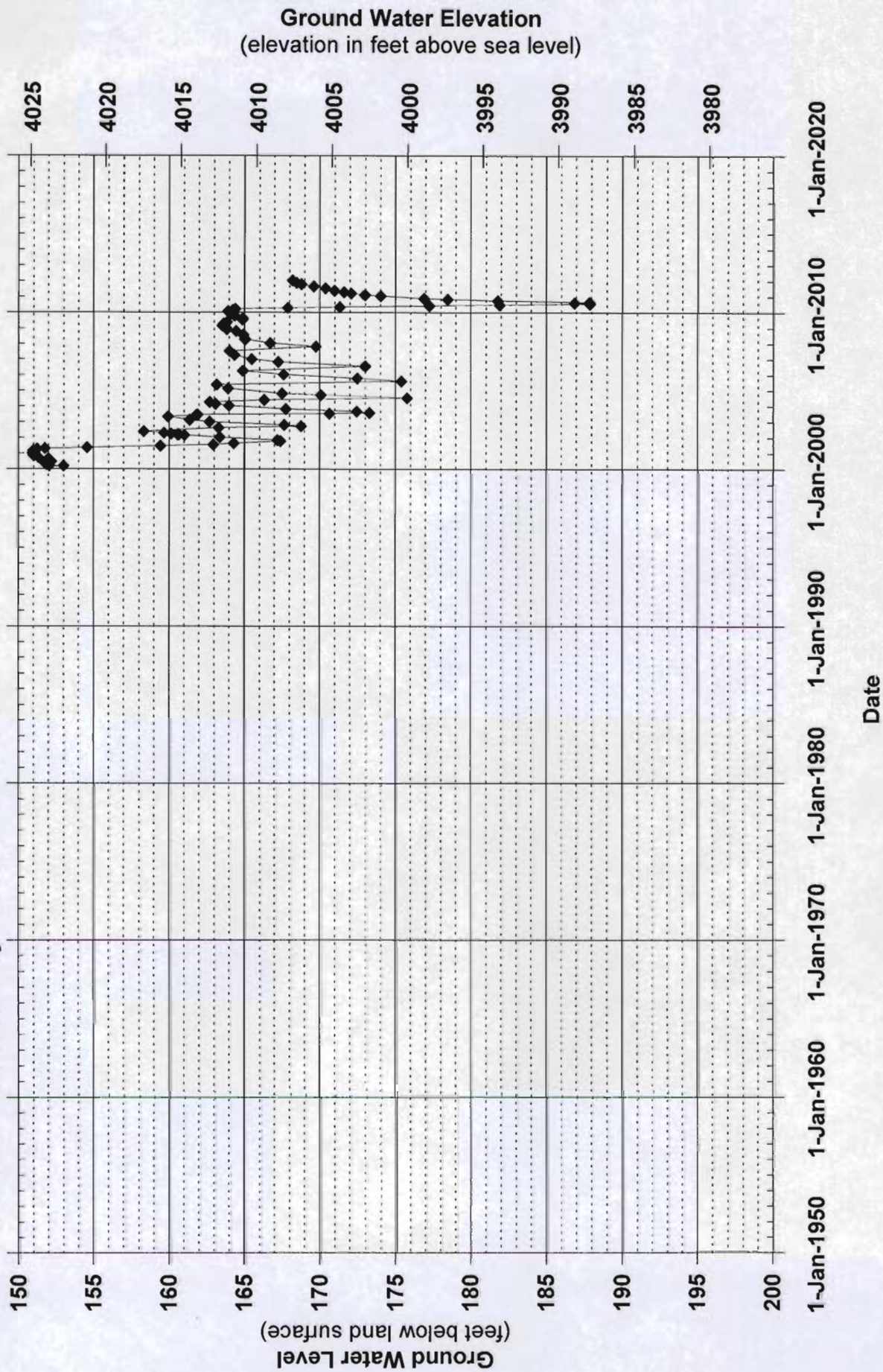
Well Depth = 865 ft
 Casing Depth = 20 ft
 Seal Depth = 20 ft
 Aquifer = Basalt



Date

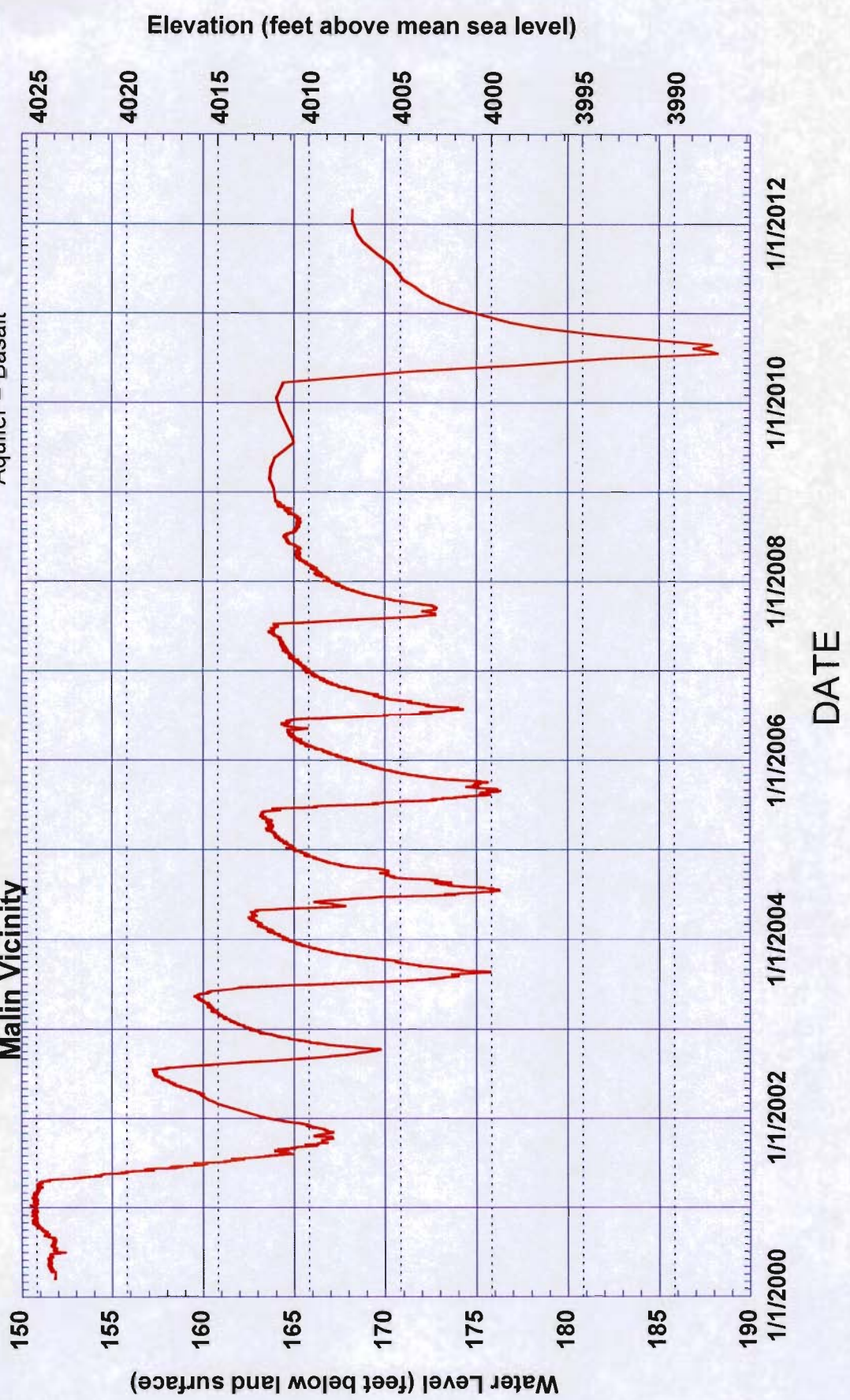
KLAM 52194
State Observation Well 1358
T40S/R12E-sec 32 cdb
Malin Vicinity

Well Depth = 447 ft
 Casing Depth = 59 ft
 Seal Depth = 58 ft
 Aquifer = Basalt

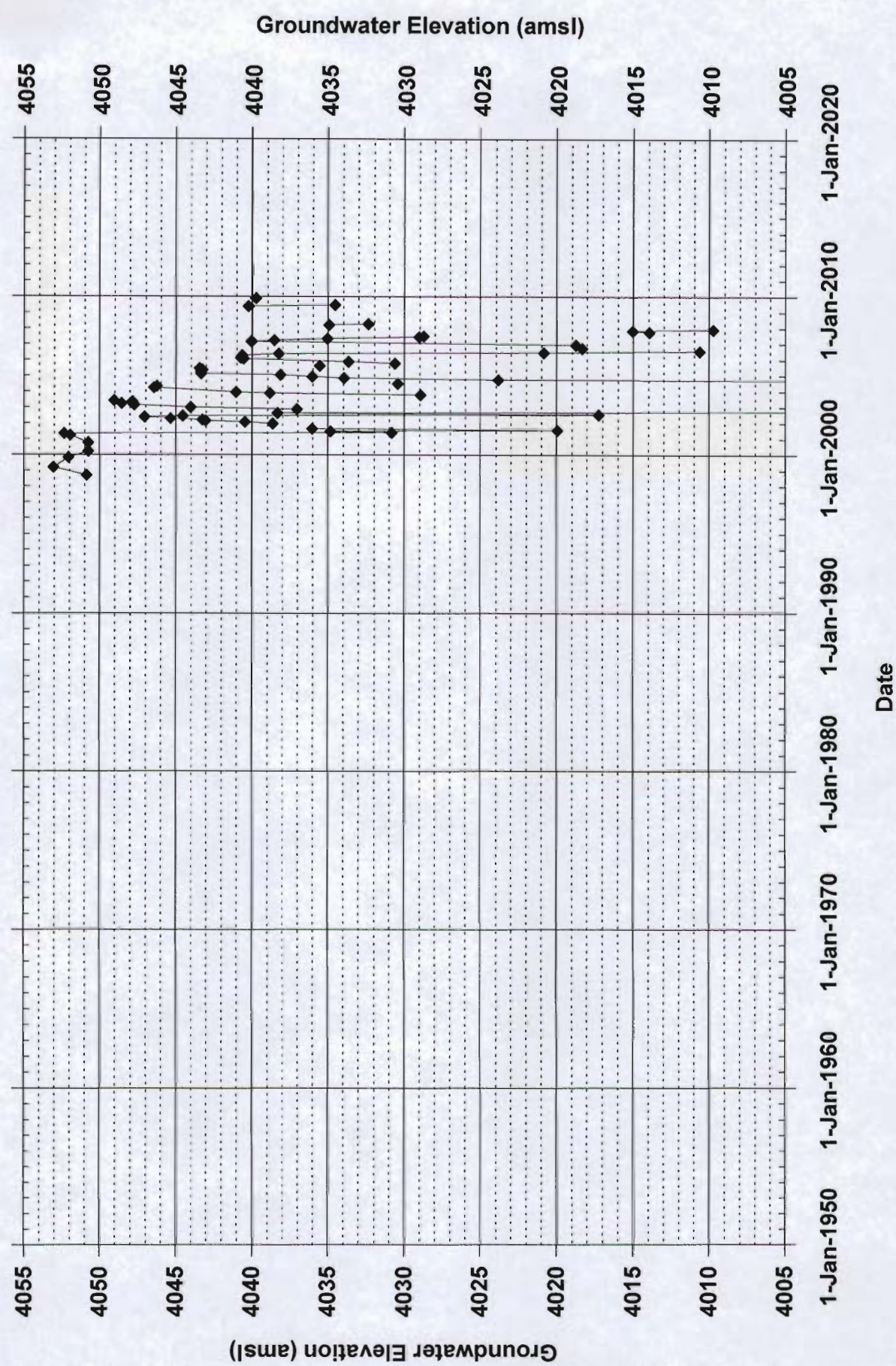


KLAM 52194
State Observation Well 1358
T40S/R12E-sec 32 cdb
Malin Vicinity

Well Depth = 447 ft
Casing Depth = 59 ft
Seal Depth = 58 ft
Aquifer = Basalt



Groundwater Level Elevation vs Time
California Well 48N_03E_14_M_001M (irrigation well)



Groundwater Level Elevation vs Time
California Well 48N_04E_16_M_001M (TID irrigation well 3)

