

MEMO

27 August, 2007

FROM: GW: GERALD H. GRONDIN
(Reviewer's Name)

YES

X NO

YES

NO

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.**

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.

[illegible]

PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section Date 27 August 2007

FROM: Ground Water/Hydrology Section Gerald H. Grondin

Reviewer's Name

SUBJECT: Application G- 16820 Supersedes review of none

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: Don Nienke County: Harney

A1. Applicant(s) seek(s) (797 gpm) 1.775 cfs from 1 well(s) in the Malheur Lake Basin,
Harney-Malhuer Lakes subbasin Quad Map: Ninemile Slough

A2. Proposed use: Irrigation (primary 142 acres) Seasonality: 1 March – 31 October (245 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	HARN	51353	Basin Fill	1.775	23S/32.5E-sec 9 DDC	200' N, 1178'W fr SE cor S 9
2						
3						
4						
5						

* 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	4125	28	28	06/07/07	290	0 – 18	+2 to 90	None	None	500	N.A.	A

Use data from application for proposed wells.

A4. Comments: _____

Well was constructed after the application was submitted. The water well report (well log) is attached. The location above is the proposed location. The owner notes the actual location is close.

Piper and others (1939), Greene and others (1972), and Walker (1979) maps and water well report HARN 51353 show basin fill sediment including black sand, cinders, and pumice at the well.

The proposed acreage and pumping rate corresponds to the application map (see attached memo).

A5. ☐ Provisions of the Malheur Lake 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: OAR 690-512 applies (see attached), see PSI analyses, see ground water elevation versus surface water elevation comments.

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

Name of administrative area: _____

Comments: Currently, no administrative area.

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) 7B, 7F, 7N;
 - ☐ 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: _____

Recommend conditions 7B, 7F, 7N

The proposed well site is located within Harney Valley in an area east of Burns and north of Malheur Lake between Ninemile Slough and Malheur Slough. The recently drilled well (HARN 51353) was completed in basin fill sediments. The area is surficially mapped as Qal by Piper and others (1939), Qal by Leonard (1970), and Qs by Greene and others (1972). The water well report notes clay, black sand, cinders, and pumice at the well.

Available data, including Piper and others (1939), Leonard (1970), and water well reports indicate ground water in the basin fill is generally unconfined and hydraulically connected to Malheur and Harney Lakes. Some local confinement can occur where discontinuous low permeability layers are present. Leonard (1970) indicates confined ground water occurs at depth in the basin in deep basin fill sediments and underlying Tertiary volcanic and sedimentary rocks. Hubbard (1975) indicates the ground water contribution to flow into Malheur Lake is small with the lake perched above ground water in most areas.

The closest wells with ground water level trend data are wells HARN 547 in T23S/R32E-sec 07 (about 8.2 miles to the west) and HARN 741 in T23S/R34E-sec 31 (about 10.8 miles to the southeast). Both are completed in sediments, and both are in the same sub-basin as the applicant's well. The ground water level data for HARN 547 is from 1960 to 2006 and for HARN 741 is from 1974 to 2006. The ground water level trend at each site show seasonal and climatic influences. A possible net decline of less than 5 feet may have occurred at both sites. Interestingly, no recovery of the annual trend is apparent from 1996 to 1999, a generally wetter than average period in Oregon. Seasonal ground water level fluctuations range from 10 to 40 feet. This could adversely impact the use of shallow wells, but likely not adversely impact the use of deeper wells.

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	Basin fill sediments	☐	☒
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation:

Available data, including Piper and others (1939), Leonard (1970), and water well reports indicate ground water in the basin fill is generally unconfined and hydraulically connected to surface water including Malheur and Harney Lakes. Some local confinement can occur where discontinuous low permeability layers are present. Leonard (1970) indicates confined ground water occurs at depth in the basin in deep basin fill sediments and underlying Tertiary volcanic and sedimentary rocks. Hubbard (1975) indicates ground water flow into Malheur Lake is small with the lake perched above ground water in most areas.

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	Ninemile Slough tributary	4097	4122	2,700	☒	☐	☐	☐	☒
1	2	Malheur Slough	4097	4125	8,000	☒	☐	☐	☐	☒
1	3	Malheur & Harney Lakes	4097	4098	72,000	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation:

The ground water elevation is based on the 7 June 2007 static water level reported by the driller on the water well report for owner well 1 (HARN 51353). Ground water elevation data for the vicinity found in Piper and others (1939), Leonard (1970), and water well reports (well logs) indicate ground water elevations have been near 4120 feet over multiple decades with seasonal fluctuations. The ground water connection to surface water may or may not be at the nearest reach.

Malheur Lake is the basin outlet for ground water flow (through evaporation). The lake elevation above is for 1983 derived from USGS 1:24,000 quadrangle maps. The distance is to the 1983 shoreline. The shoreline location can significantly vary.

Water Availability Basin the well(s) are located within:

RATTLESNAKE CR > NINEMILE SL - AT MOUTH
MALHEUR SL > MALHEUR L - AB NINEMILE SL
No WAB for Harney & Malheur Lakes

- C3a. 690-09-040 (4): Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ 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?
I	I	☐	☐	None	N.A.	☐	0.26	☒	7.2	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

- C3b. 690-09-040 (4): Evaluation of stream impacts by **total appropriation** for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	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?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: _____

The distance from owner well 1 (HARN 51353) to Ninemile Slough tributary is less than 1 mile (2,700 feet).

Potential for substantial interference must be assumed given the proposed pumping rate exceeds 1 percent of the natural flow (80 percent exceedance).

Hunt (1999) was used to calculate the interference at the Ninemile Slough tributary given the well will likely not penetrate the basin fill sediments. The values used for the calculations are conservative and appropriate until better values become available. The calculations used a transmissivity of 7,500 ft²/day which is consistent for Eastern Oregon basin fill transmissivities noted by Gonthier (1985) and transmissivity values derived from specific capacity data from wells in T23S/R32.57E-sec 10, 13, 14, 15, 22, and 24 (HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204). Additionally, the calculation used an assumed intermediate storage coefficient (0.001). The hydraulic conductivity assigned to the bed of the tributary is 0.20 feet/day.

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
1	2	10.8%	9.73%	5.08%	8.19%	10.5%	12.4%	14.1%	15.5%	16.8%	18.0%	14.6%	12.3%
Well Q as CFS		0.00	0.00	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	0.00	0.00
Interference CFS		0.192	0.173	0.090	0.145	0.187	0.221	0.250	0.275	0.298	0.319	0.260	0.218
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.		0.192	0.173	0.090	0.145	0.187	0.221	0.250	0.275	0.298	0.319	0.260	0.218
(B) = 80 % Nat. Q		1.10	3.72	10.90	14.00	9.83	5.80	1.18	0.41	0.24	0.20	0.38	0.75
(C) = 1 % Nat. Q		0.011	0.037	0.109	0.140	0.098	0.058	0.012	0.004	0.002	0.002	0.004	0.008
(D) = (A) > (C)		Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(E) = (A / B) x 100		17.5%	4.65%	0.83%	1.04%	1.90%	3.81%	21.2%	67.1%	124.4%	160.0%	68.4%	29.1%

(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:

The well site is more than 1 mile from Malheur Slough (8,000 feet).

Hunt (1999) was used to calculate the interference at the Malheur Slough given the well will likely not penetrate the basin fill sediments. The values used for the calculations are conservative and appropriate until better values become available. The calculations used a transmissivity of 7,500 ft²/day which is consistent for Eastern Oregon basin fill transmissivities noted by Gonthier (1985) and transmissivity values derived from specific capacity data from wells in T23S/R32.57E-sec 10, 13, 14, 15, 22, and 24 (HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204). Additionally, the calculation used an assumed intermediate storage coefficient (0.001). The hydraulic conductivity assigned to the bed of the tributary is 0.20 feet/day.

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: _____

*** This analysis was not done given there is no WAB for Malheur and Harney Lakes.

Drawdown at Malheur and Harney Lakes was estimated using the Theis drawdown equation. The calculations used a transmissivity of 7,500 ft²/day which is consistent for Eastern Oregon basin fill transmissivities noted by Gonthier (1985) and transmissivity values derived from specific capacity data from wells in T23S/R32.57E-sec 10, 13, 14, 15, 22, and 24 (HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204). Additionally, the calculation used an assumed intermediate storage coefficient (0.001). The estimated drawdown for continuous pumping at the full proposed rate ranged from less than 0.01 foot at the end of 30 days to about 0.60 feet at the end of 245 days. The estimated drawdown for a lower pro-rated pumping rate ranged from less than 0.01 feet at the end of 30 days to about 0.30 feet at the end of 245 days.

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:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. SW / GW Remarks and Conditions: Recommend conditions 7B, 7F, and 7N if a permit is issued.

The distance from owner well 1 (HARN 51353) to Ninemile Slough tributary is less than 1 mile (2,700 feet). A potential for substantial interference must be assumed given the proposed pumping rate exceeds 1 percent of the natural flow (80 percent exceedance).

The proposed well site is located within Harney Valley in an area east of Burns and north of Malheur Lake between Ninemile Slough and Malheur Slough. The recently drilled well (HARN 51353) was completed in basin fill sediments.

Available data, including Piper and others (1939), Leonard (1970), and water well reports indicate ground water in the basin fill is generally unconfined and hydraulically connected to Malheur and Harney Lakes. Some local confinement can occur where discontinuous low permeability layers are present. Leonard (1970) indicates confined ground water occurs at depth in the basin in deep basin fill sediments and underlying Tertiary volcanic and sedimentary rocks. Hubbard (1975) indicates the ground water contribution to flow into Malheur Lake is small with the lake perched above ground water in most areas.

There is a general and increasing local concern about ground water availability in the Harney Valley.

The closest wells with ground water level trend data are wells HARN 547 in T23S/R32E-sec 07 (about 8.2 miles to the west) and HARN 741 in T23S/R34E-sec 31 (about 10.8 miles to the southeast). Both are completed in sediments, and both are in the same sub-basin as the applicant's well. The ground water level data for HARN 547 is from 1960 to 2006 and for HARN 741 is from 1974 to 2006. The ground water level trend at each site show seasonal and climatic influences. A possible net decline of less than 5 feet may have occurred at both sites. Interestingly, no recovery of the annual trend is apparent from 1996 to 1999, a generally wetter than average period in Oregon. Seasonal ground water level fluctuations range from 10 to 40 feet. This could adversely impact the use of shallow wells, but likely not adversely impact the use of deeper wells.

References Used: Oregon Administrative Rules: OAR 690-512

Piper, A.M., Robison, T.W., and Park C.F. 1939. Geology and Ground Water Resources of the Harney Basin, Oregon. USGS Water Supply Paper 841.

Leonard, A.R. 1970. Ground-Water Resources in Harney Valley, Harney County, Oregon. Ground Water Report 16, Oregon Water Resources Department, Salem, Oregon.

Greene, R.C., Walker, G.W., and Corcoran, R.E. 1972. Geologic Map of the Burns Quadrangle, Oregon. USGS Miscellaneous Geologic Investigations Map I-680.

Hubbard, Larry. L. 1975. Hydrology of Malheur Lake, Harney County, Southeastern Oregon. USGS Water Resources Investigation 21-75.

Walker, G.W. 1979. Revisions to the Cenozoic Stratigraphy of Harney Basin, Southeastern Oregon. USGS Bulletin 1475.

Gonthier, J.B. 1985. A Description of Aquifer Units in Eastern Oregon. USGS Water Resources Investigations Report 84-4095.

OWRD water well reports and/or hydrographs: HARN 547, HARN 741, HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: 1 Logid: HARN 51353

D2. **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.

Remark: Route to the Enforcement Section. I recommend withholding issuance of the permit until the Enforcement Section and the Ground Water Section approve the current well construction or any necessary reconstruction.

- 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).**

Oregon Water Resources Department Memorandum

Date: 9 August 2007
To: Water Right Application File G-16820
From: Jerry Grondin, OWRD Hydrogeologist
Subject: Record of Conversation with Ground Water Permit Applicant Don Nienke
Ground Water Application Number: G-16820

On 9 August 2007, I spoke via telephone with Don Nienke who submitted ground water application G-16820. There is a post-it note by water rights section staff Connie Vance indicating the application requests to irrigate 130 acres on the application form, but the application map shows 142 acres. I asked Mr. Nienke what I should use for the ground water section review.

	Application Form	Application Map
Acres	130 acres	142 acres
Maximum Rate	1.625 cfs (729 gpm)	1.775 cfs (797 gpm)

Mr. Nienke indicated the review should use what corresponds to the application map.

Mr. Nienke noted that the well has recently been drilled at a location close to the proposed location. I subsequently found water right report (well log) HARN 51353. The well was completed on 7 June 2007.

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The Oregon Administrative Rules contain OARs filed through July 13, 2007

WATER RESOURCES DEPARTMENT

DIVISION 512

MALHEUR LAKE BASIN PROGRAM PROVISION

690-512-0040

Water Availability

(1) Except as provided in section (3) of this rule, the Department shall not accept an application for permit, or issue a permit, for any use of surface water, or of groundwater the use of which has the potential to substantially interfere with surface water, in the Malheur Lake Basin unless the applicant shows, by a preponderance of evidence, that unappropriated water is available to supply the proposed use at the times and in the amounts requested. The evidence provided shall be prepared by a qualified hydrologist or other water resources specialist and shall include:

(a) Streamflow measurements of gage records from the source or, for use of groundwater, the stream in hydraulic connection with the source; or

(b) An estimate of water availability from the source or, for use of groundwater, the stream in hydraulic connection with the source which includes correlations with streamflow measurements or gage records on other, similar streams and considers current demands for water affecting the streamflows.

(2) The criteria used in determining if the use of groundwater has the potential to substantially interfere with surface water shall be those established in OAR Chapter 690, Division 9.

(3) This rule shall not apply to issuance of:

(a) Instream water rights;

(b) Permits for storage of water between March 1 and May 31 if the application is not required to be referred to the Commission under OAR 690-011-0080(2)(a)(C); or

(c) Permits for use of water legally stored.

Stat. Auth.: ORS 536.300 & ORS 536.340

Stats. Implemented:

Hist.: WRD 3-1985, f. & cert. ef. 3-28-85; WRD 23-1990, f. & cert. ef. 12-14-90; Administrative Renumbering 1-1993, Renumbered from 690-080-0120

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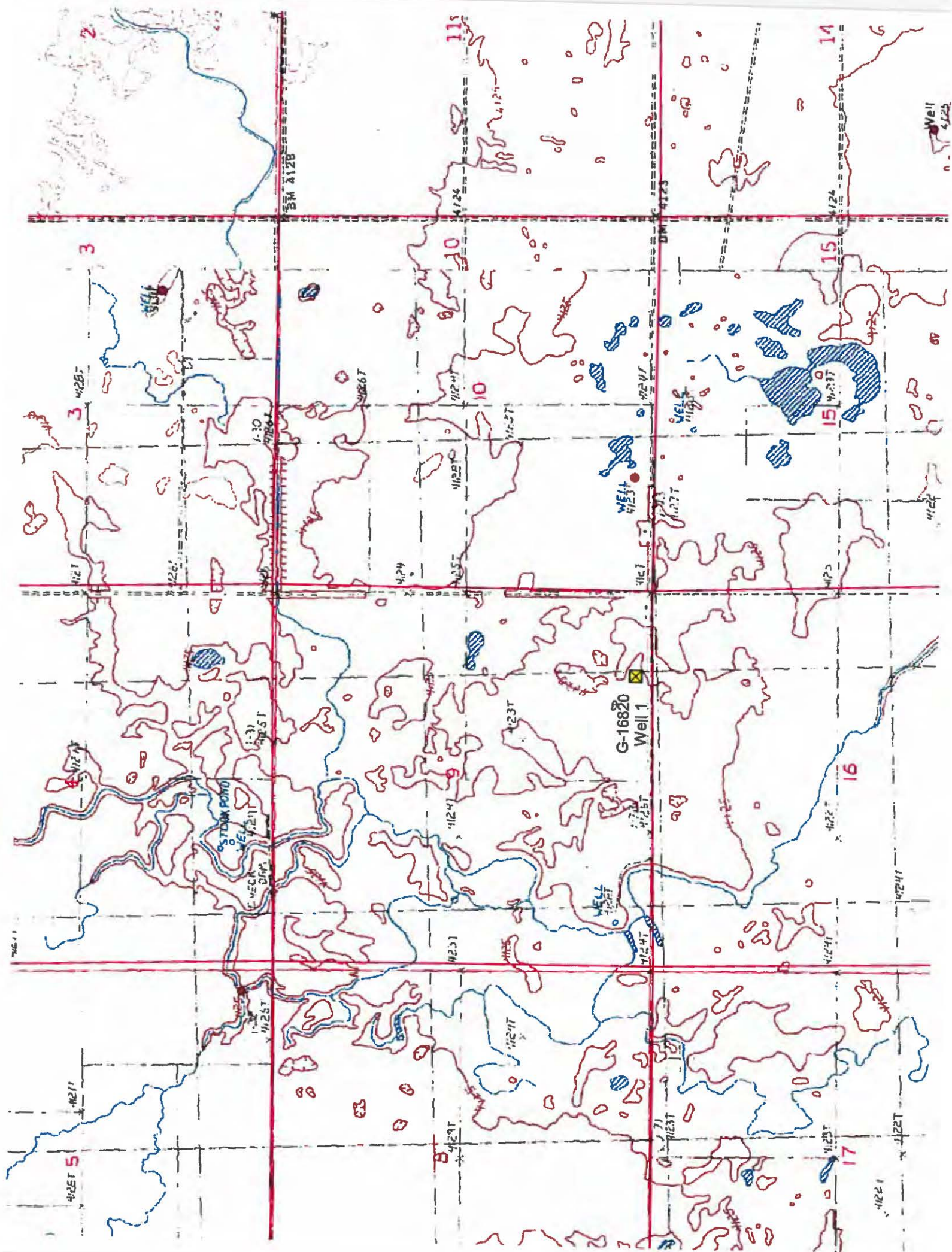
[Numerical Index by OAR Chapter Number](#)

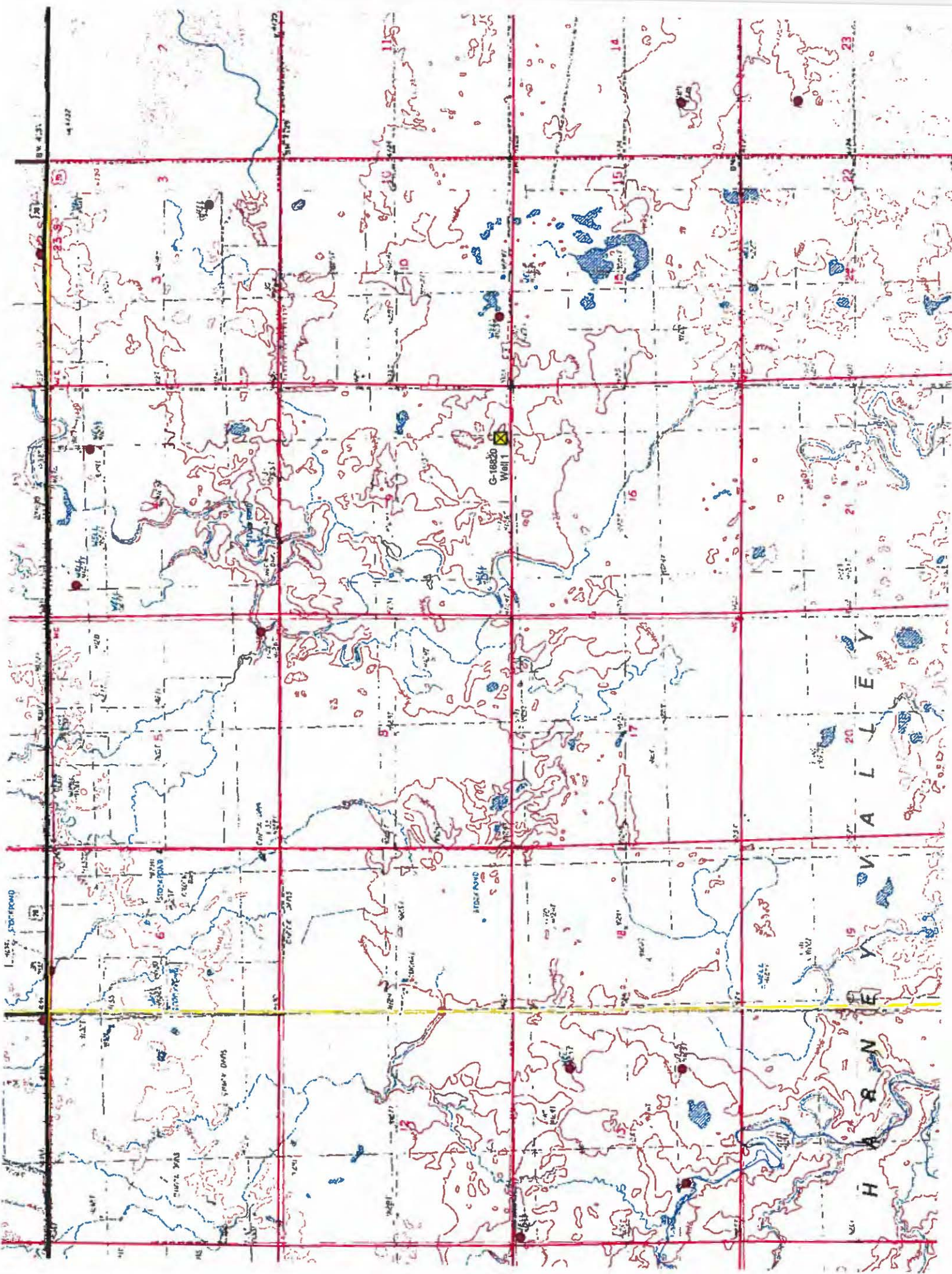
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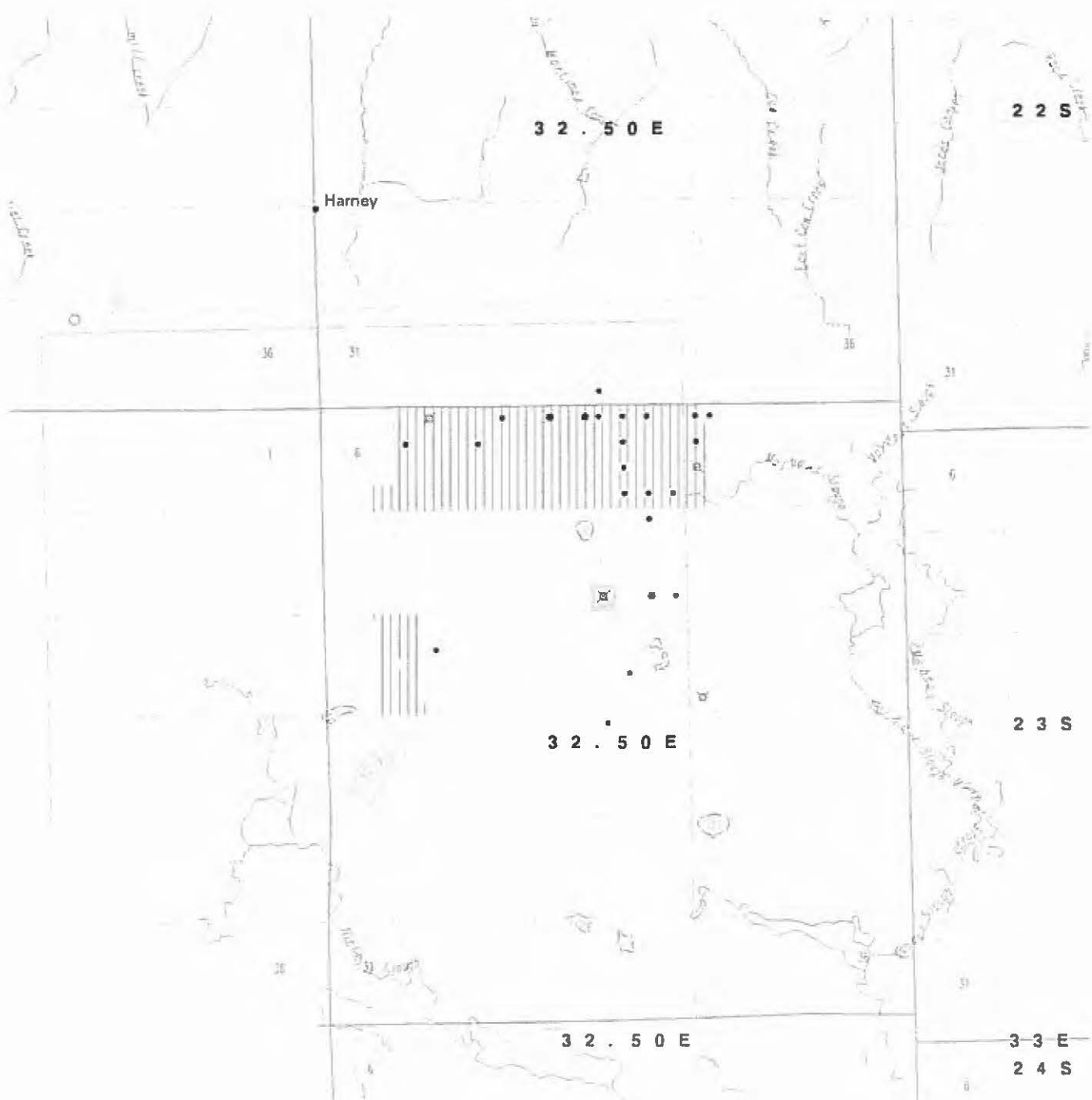
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Wells in the vicinity of application G 16820

- | | | | |
|---|--|---|---|
|  Application well(s) in this 1/4-1/4 section | • Well(s) identified in this 1/4-1/4 section from OWRD's well log database within 1 mi. radius of application well(s) |  Conditioned, permitted well(s) in this 1/4 1/4 section within 5 mi. radius of application well(s) | — Critical GW Area |
|  Well(s) identified in this section from OWRD's well log database within 1 mi. radius of application well(s) |  Permitted well(s) in this 1/4-1/4 section within 1 mi. radius of application well(s) |  OWRD Observation well and well-d within 5 mi. radius of application well(s) |  Regulated GW Area |



WELL LOGS WITHIN 1 MILE OF APPLICATION G 16820

ABANDON: 0
 RECONDITIONED: 1
 REPAIRED: 0
 CONVERSION: 0
 DEEPENINGS: 0
 NEW CONSTRUCT: 41

COMMUNITY USE: 0
 DOMESTIC USE: 32
 INDUSTRIAL USE: 0
 INJECTION USE: 0
 IRRIGATION USE: 8
 THERMAL USE: 0
 LIVESTOCK USE: 2

PERMITTED WELLS WITHIN 1 MILE OF APPLICATION G 16820

\$RECNO	APPLICATION PERMIT	CLAIM	LOC-QQ	USE_CODE
1			23.00S32.50E 4NWNE	
2			23.00S32.50E 4NENW	
3			23.00S32.50E 5NWNW	
4			23.00S32.50E 3NESE	
5			23.00S32.50E10SESW	
6	G 16820	0	0 23.00S32.50E 9SESE	IR
7	G 16819	0	0 23.00S32.50E15SESE	IR

CONDITIONED WELLS WITHIN 5 MILES OF APPLICATION G 16820

\$RECNO	APPLICATION PERMIT	LOC-QQ	CONDITION-CODE
1	G 13702 G 12067	22.00S32.00E34NWNE	4IG
1	G 13702 G 12067	22.00S32.00E34NWNE	4IR

APPLICATION G 16820 FALLS WITHIN THESE QUAD(S)

NINEMILE SLOUGH

Well Location	23.00S32.00E7CAB
Oregon Water Resources Department Well Log ID	HARN 547
Oregon Water Resources Department State Observation Well Number	169
Well depth, in feet below land surface	93
Land surface elevation, in feet above mean sea level	4134
Primary use of well	not determined

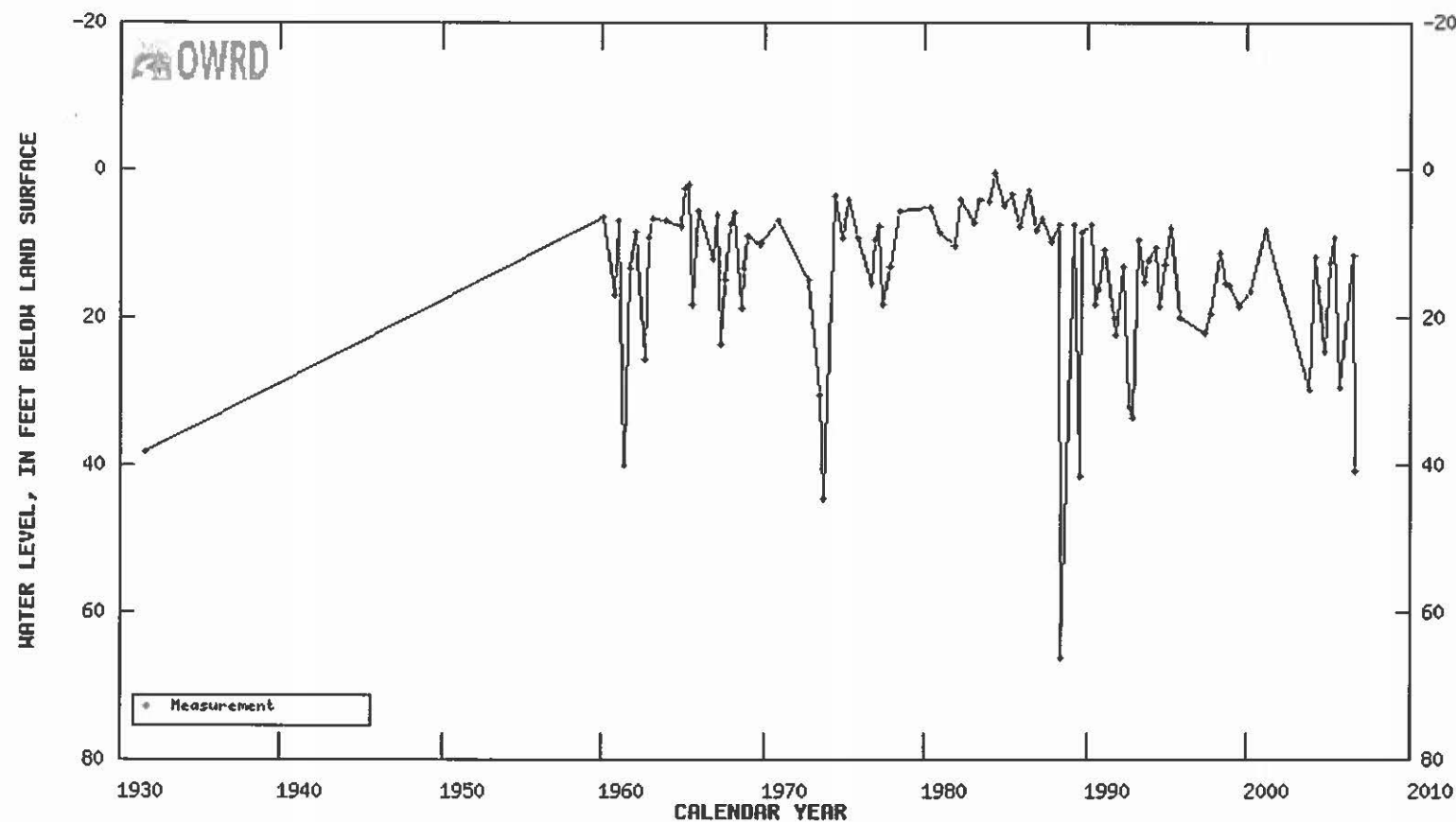


Table showing water-level data for State Well HARN 547, State Observation Well # 169

Well Location

23.00S34.00E31A00

Oregon Water Resources Department Well Log ID

HARN 741

Oregon Water Resources Department State Observation Well Number

172

Well depth, in feet below land surface

207

Land surface elevation, in feet above mean sea level

4156

Primary use of well

not determined

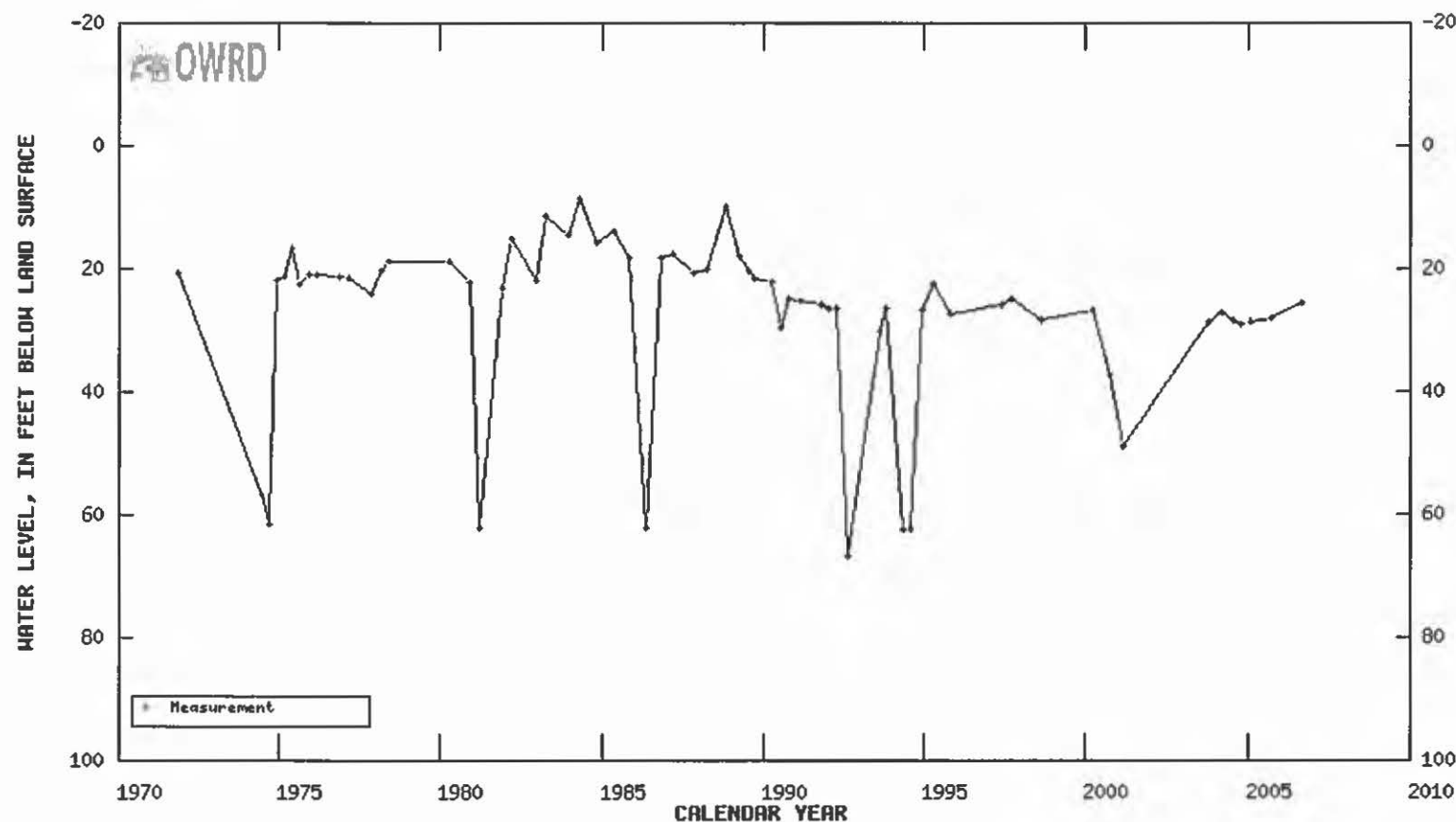
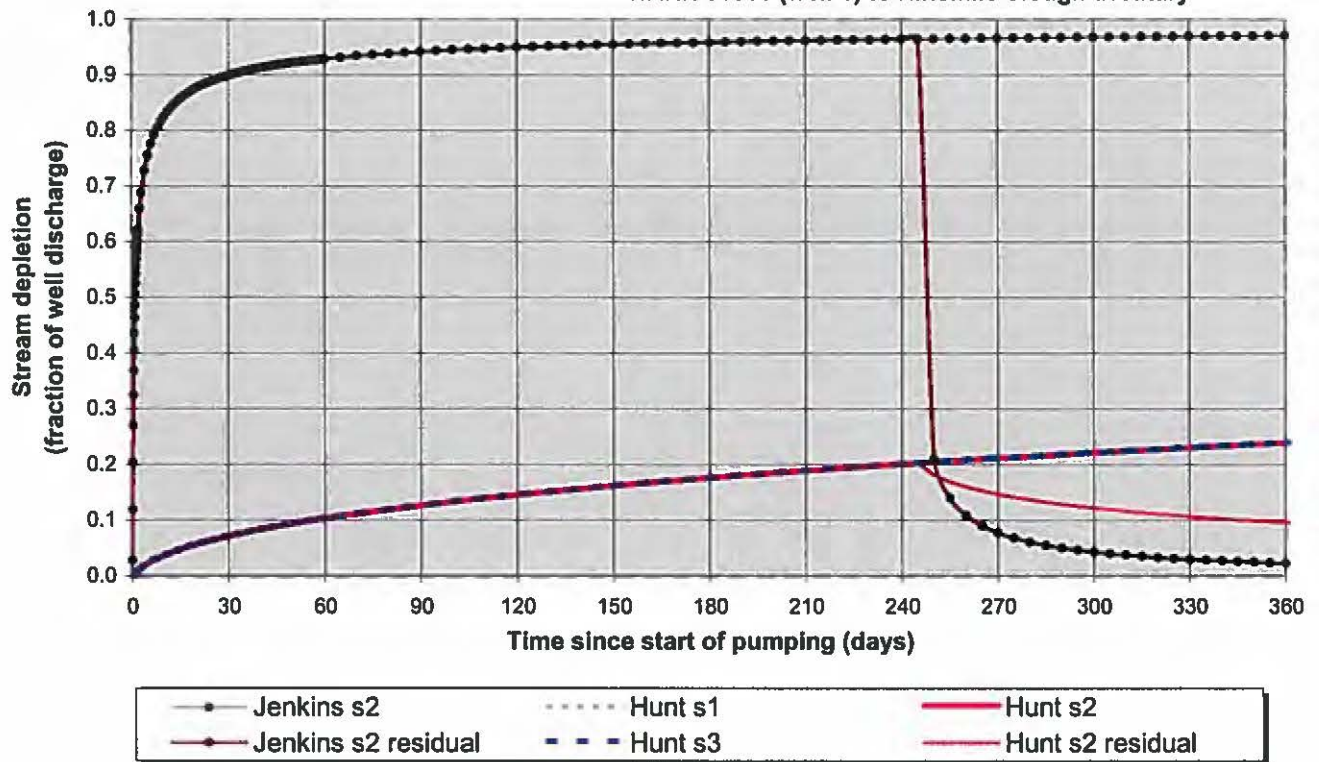


Table showing water-level data for State Well HARN 741, State Observation Well # 172

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)

HARN 51353 (well 1) to Ninemile Slough tributary



Output for Hunt Stream Depletion, Scenarion 2 (s2): Time pump on = 245 days

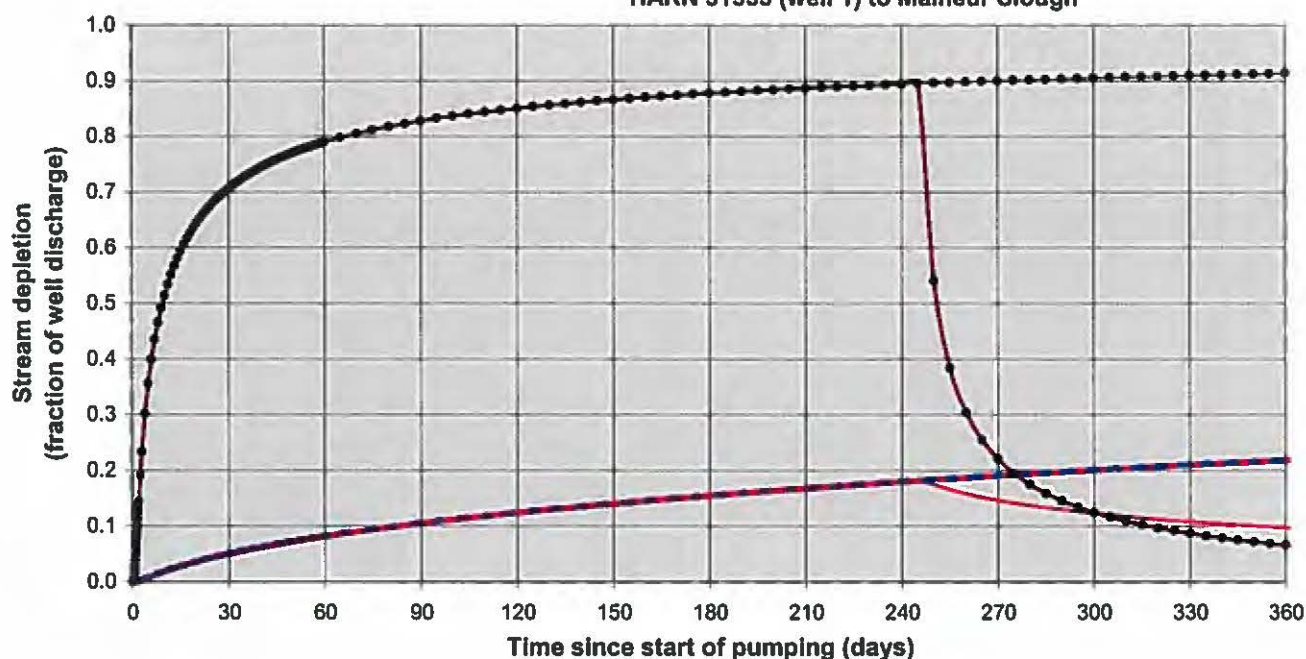
Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.0717	0.1036	0.1269	0.1459	0.1620	0.1762	0.1890	0.2005	0.1464	0.1219	0.1067	0.0958
Qw, cfs	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775
H SD s2, cfs	0.127	0.184	0.225	0.259	0.288	0.313	0.335	0.356	0.260	0.216	0.189	0.170

Parameters:

		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	1.775	1.775	1.775	cfs
Distance to stream	a	2700	2700	2700	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer thickness	b	150	150	150	ft
Aquifer transmissivity	T	7500	7500	7500	ft ² /day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	10	10	10	ft
Streambed hydraulic conductivity	Ks	0.2	0.2	0.2	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	0.08	0.08	0.08	ft/day
Stream depletion factor (Jenkins)	sdf	0.972	0.972	0.972	days
Streambed factor (Hunt)	sbf	0.0288	0.0288	0.0288	

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)

HARN 51353 (well 1) to Malheur Slough



Output for Hunt Stream Depletion, Scenierio 2 (s2): Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.0508	0.0819	0.1052	0.1243	0.1406	0.1550	0.1679	0.1796	0.1463	0.1230	0.1081	0.0973
Qw, cfs	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775	1.775
H SD s2, cfs	0.090	0.145	0.187	0.221	0.250	0.275	0.298	0.319	0.260	0.218	0.192	0.173

Parameters:

		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	1.775	1.775	1.775	cfs
Distance to stream	a	8000	8000	8000	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer thickness	b	150	150	150	ft
Aquifer transmissivity	T	7500	7500	7500	ft ² /day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	10	10	10	ft
Streambed hydraulic conductivity	Ks	0.2	0.2	0.2	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	0.08	0.08	0.08	ft/day
Stream depletion factor (Jenkins)	sdf	8.533333333	8.533333333	8.533333333	days
Streambed factor (Hunt)	sbf	0.085333333	0.085333333	0.085333333	

Drawdown Calculations Using Theis Equation

Theis Equation: $s = [Q/(4 \cdot T \cdot \pi)] [W(u)]$

$u = (r^2 S)/(4 \cdot T \cdot t)$

$W(u) = (-\ln u) - (0.5772157) + (u/1 \cdot 1!) - (u^2/2 \cdot 2!) + (u^3/3 \cdot 3!) - (u^4/4 \cdot 4!) + \dots$

s = drawdown (L)

T = transmissivity (L²/T)

S = storage coefficient (dimensionless)

pi = 3.141592654

r = radial distance (L)

t = time (T)

u = dimensionless

W(u) = well function

Transmissivity T (gpd/ft)	Transmissivity T (ft ² /day)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft ³ /sec)	Time t (days)	Distance r (feet)	pi	u	W(u)	Drawdown s (feet)	Comments
								Note : W(u) calculation valid when u < 7.1			
								7.0000	1.1545E-04		W(u) calculation test
Application G-16820 owner well 1 (HARN 51353) to Malheur and Harney Lakes											
56,103.90	7,500.00	0.00100	796.68	1.78	30.00	72,000.00	3.14	5.7600	0.0005	0.0008	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	60.00	72,000.00	3.14	2.8800	0.0152	0.0247	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	90.00	72,000.00	3.14	1.9200	0.0547	0.0889	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	120.00	72,000.00	3.14	1.4400	0.1094	0.1780	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	150.00	72,000.00	3.14	1.1520	0.1710	0.2783	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	180.00	72,000.00	3.14	0.9600	0.2347	0.3819	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	210.00	72,000.00	3.14	0.8229	0.2981	0.4850	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	240.00	72,000.00	3.14	0.7200	0.3599	0.5857	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	796.68	1.78	245.00	72,000.00	3.14	0.7053	0.3700	0.6021	Continuous Pumping at Full Rate
56,103.90	7,500.00	0.00100	393.46	0.88	30.00	72,000.00	3.14	5.7600	0.0005	0.0004	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	60.00	72,000.00	3.14	2.8800	0.0152	0.0122	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	90.00	72,000.00	3.14	1.9200	0.0547	0.0439	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	120.00	72,000.00	3.14	1.4400	0.1094	0.0879	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	150.00	72,000.00	3.14	1.1520	0.1710	0.1374	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	180.00	72,000.00	3.14	0.9600	0.2347	0.1886	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	210.00	72,000.00	3.14	0.8229	0.2981	0.2395	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	240.00	72,000.00	3.14	0.7200	0.3599	0.2892	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	393.46	0.88	245.00	72,000.00	3.14	0.7053	0.3700	0.2974	Pro-Rated Pumping Rate