

MEMO

20 June 2012, 200

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

YES

 X NO

YES

X 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.

DISTRIBUTION OF INTERFERENCE

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

[illegible]

PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section **Date** 20 June 2012

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

SUBJECT: Application **G-17548** 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: **Schofield Family Limited Partnership** County: **Lake**

A1. Applicant(s) seek(s) **4.00 (1,795 gpm)** cfs from **2** well(s) in the **Goose and Summer Lakes** Basin,
Lake Abert (Chewaucan) sub basin Quad Map: **Valley Falls**

A2. Proposed use: **Irrigation (260 acres primary)** Seasonality: **1 March to 31 October (245 days)**

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

Well 1	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	Not Drilled	1	Basin-fill or Basalt	2.00	35S/21E-sec 32 DCC	142'N, 2440'W fr SE cor S 32
2	Not Drilled	2	Basin-fill or Basalt	2.00	35S/21E-sec 32 DAC	1330'N, 865'W fr SE cor S 32
3						

* 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	4312	?	4305	N.A.	?	Min	Min	?	TBD	?	?	?
2	4307	?	4305	N.A.	?	Min	Min	?	TBD	?	?	?
3												

Use data from application for proposed wells.

A4. Comments: _____

The proposed wells are not yet drilled. The static water level in the table above was derived as an intermediate value between the approximate static water level for the irrigation wells in T36S/R21E-sec 5 and for the irrigation well in the northwest corner of T35S/R21E-sec 32.

The total proposed rate (4 cfs) is greater than typically allowed for 260 acres (3.25 cfs = 1,459 gpm).

The proposed aquifer is the predominantly basin-fill sediment unit or the predominantly basalt unit below the basin-fill sediments. Geologic mapping (Walker 1963) indicates sedimentary deposits (Qts) at the well sites. This review include these sedimentary deposits as part of a more general predominantly basin fill sedimentary unit. Walker describes the Qts as composed of lacustrine, fluvatile, and aeolian sedimentary rocks, interstratified tuff, ash diatomite, and unconsolidated clay, sand, silt, and gravel.

This review recommends requiring the wells to obtain groundwater solely from the predominantly basalt unit which might be first encountered below 500 or 600 feet depth or deeper based on water well reports for wells LAKE 1769 and LAKE 51282.

- A5. ☐ Provisions of the Goose & Summer Lakes 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 690-513-0050 (Chewaucan Subbasin) applies. Groundwater and surface water appear to be classified whereby agricultural use is allowed.

- 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, 410-0070

- B1. 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:
- i. ☒ The permit should contain condition #(s) 7B, 7F, 7N, 7T
- ii. ☐ The permit should be conditioned as indicated in item 2 below.
- iii. ☒ 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: _____

Multiple reports for the Goose and Summer Lakes Basin indicate groundwater occurs in both the predominantly basin-fill sediment unit and the predominantly basalt unit and groundwater is vertically connected within each unit and vertically connected between each unit.

The only long-term groundwater data for the Crooked Creek drainage vicinity were groundwater level measurements at a retired, 20-foot deep, hand-dug state observation well SOW 456 (well LAKE 1808) located in T36S/R21E-sec 06 ABA, one section southwest of the proposed wells. The water level data was from 1938 to 1962. In 1938, the water level was about 17 feet below land surface. From 1938 to 1956, the water level rose about 7 feet to about 10 feet below land surface. From 1958 to 1962, the water level declined to about 3 feet to about 13.5 feet below land surface. These annual trends appear climate controlled. Seasonal fluctuations appear to be about 1.5 feet.

If a groundwater right permit is issued, the following conditions are recommended: 7B, 7F, 7N, 7T, and

Special well construction condition: "Each permitted well shall obtain groundwater solely from the predominantly basalt unit (which may contain some sedimentary layers) that underlies the predominantly basin-fill sediment unit (which may contain some basalt layers). Each well shall have continuous casing and continuous seal from land surface, through the predominantly basin-fill unit, and 5 feet into the predominantly basalt unit at minimum. Note: the depth to the predominantly basalt unit varies with location."

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	Application proposes basin-fill or basalt GW review recommends basalt requirement	☐	☒
2	Application proposes basin-fill or basalt GW review recommends basalt requirement	☐	☒
3		☐	☐
4		☐	☐

Basis for aquifer confinement evaluation:

System is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. Generally, a low transmissivity (low permeability) predominantly basin-fill sediment unit of varying thickness overlies a higher transmissivity (higher permeability) predominantly basalt unit. Available data indicates groundwater occurs in both the predominantly basin-fill sediment unit and the predominantly basalt unit and groundwater is vertically connected within each unit and vertically connected between each unit.

The proposed aquifer is the predominantly basin-fill sediment unit or the predominantly basalt unit below the basin-fill sediments. Geologic mapping (Walker 1963) indicates sedimentary deposits (Qts) at the well sites. This review includes these sedimentary deposits as part of a more general predominantly basin fill sedimentary unit. Walker describes the Qts as composed of lacustrine, fluvial, and aeolian sedimentary rocks, interstratified tuff, ashy diatomite, and unconsolidated clay, sand, silt, and gravel.

This review recommends requiring the wells to obtain groundwater solely from the predominantly basalt unit which might be first encountered below 500 or 600 feet depth or deeper based on water well reports for wells LAKE 1769 and LAKE 51282.

- 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	Crooked Creek	4305	4,290	5,450	☒	☐	☐	☐	☒
2	1	Crooked Creek	4305	4,290	5,650	☒	☐	☐	☐	☒
1	2	Chewaucan River	4305	4,280	9,840	☒	☐	☐	☐	☒
2	2	Chewaucan River	4305	4,280	8,460	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: _____

Crooked Creek drains to the Chewaucan River that drains to Lake Abert.

Available data indicates ground water discharges to surface water in the sub-basin. These include reports, water availability data, USGS map showing Crooked Creek and the Chewaucan River are a perennial creek and river, air photo (FSA 2009) indicating the creek and river are perennial, and reported static groundwater levels for wells LAKE 52274, LAKE 1769, and LAKE 51282 indicating groundwater levels above the creek and river and a local groundwater flow gradient toward the creek.

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

Officially: CHEWAUCAN R > LABERT - AT MOUTH

Unofficially: CROOKED CR > CHEWAUCAN R - AT MOUTH

The wells are closer to Crooked Creek and hydraulically connected to the creek. The wells are additionally hydraulically connected to the Chewaucan River which is further away from the wells than Crooked Creek. Both the creek and river will be considered in the interference assessments.

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
1	1	0.3%	0.3%	0.3%	0.4%	0.4%	0.5%	0.5%	0.6%	0.6%	0.6%	0.4%	0.4%
Well Q as CFS		0.00	0.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00
Interference CFS		0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.003	0.003
2	1	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS		0.00	0.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00
Interference CFS		0.003	0.003	0.002	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.003	0.003
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		0.006	0.006	0.005	0.006	0.006	0.008	0.008	0.008	0.010	0.010	0.006	0.006
(B) = 80 % Nat. Q		8.03	13.90	22.60	44.50	55.40	26.90	9.06	6.09	6.05	6.65	7.08	7.43
(C) = 1 % Nat. Q		0.080	0.139	0.226	0.445	0.554	0.269	0.091	0.061	0.061	0.067	0.071	0.074
(D) = (A) > (C)		No	No	No	No	No	No	No	No	No	No	No	No
(E) = (A / B) x 100		0.075	0.043	0.022	0.013	0.011	0.030	0.088	0.131	0.165	0.150	0.085	0.081

(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:

SW# 1 is Crooked Creek. Both of the proposed wells are more than 1.0 mile from Crooked Creek.

Hunt (2003) was used to calculate the interference given the recommended condition that the wells obtain groundwater from the predominantly basalt unit below the predominantly basin fill sediment unit. The calculations used a horizontal hydraulic conductivity of 30 feet/day (transmissivity = 15,000 ft²/day which is consistent with Morgan (1988) and McFarland and Ryals (1991)), a vertical conductivity of 0.3 feet/day, 0.01 for the storage coefficient, and a basin-fill sediment thickness of 350 feet at the stream (based on LAKE 52274). The stream width used for the calculation (100 feet) is likely greater than the actual stream width. A smaller stream width would result in a smaller calculated interference.

When obtaining groundwater from the predominant basalt unit, the calculated interference with the creek for each month remains less than 1.00 percent of the natural stream flow (80 percent exceedance). It should be noted that pumping groundwater from the predominantly basin-fill unit would likely result in interference with the creek that exceeds the 1.00 percent of the natural stream flow (80 percent exceedance) during some months. That is a major reason why groundwater needs to be obtained from the predominantly basalt unit only.

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
1	2	0.2%	0.2%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.2%	0.2%
Well Q as CFS		0.00	0.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00
Interference CFS		0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002
2	2	0.2%	0.2%	0.1%	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.4%	0.3%	0.2%
Well Q as CFS		0.00	0.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00
Interference CFS		0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		0.004	0.004	0.002	0.003	0.003	0.003	0.004	0.004	0.005	0.005	0.004	0.004
(B) = 80 % Nat. Q		33.80	64.90	103.0	161.0	314.0	234.0	81.90	47.40	42.30	42.20	34.40	32.80
(C) = 1 % Nat. Q		0.338	0.649	1.030	1.610	3.140	2.340	0.819	0.474	0.423	0.422	0.344	0.328
(D) = (A) > (C)		No	No	No	No	No	No	No	No	No	No	No	No
(E) = (A / B) x 100		0.012	0.006	0.002	0.002	0.001	0.001	0.005	0.008	0.012	0.012	0.012	0.012

(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: _____

SW# 2 is the Chewaucan River. Both of the proposed wells are more than 1.0 mile from the Chewaucan River.

Hunt (2003) was used to calculate the interference given the recommended condition that the wells obtain groundwater from the predominantly basalt unit below the predominantly basin fill sediment unit. The calculations used a horizontal hydraulic conductivity of 30 feet/day (transmissivity = 15,000 ft²/day which is consistent with Morgan (1988) and McFarland and Ryals (1991)), a vertical conductivity of 0.3 feet/day, 0.01 for the storage coefficient, and a basin-fill sediment thickness of 350 feet at the stream (based on LAKE 52274). The stream width used for the calculation (100 feet) is approximate to the actual stream width. A smaller stream width would result in a smaller calculated interference.

When obtaining groundwater from the predominant basalt unit, the calculated interference with the river for each month remains less than 1.00 percent of the natural stream flow (80 percent exceedance). It should be noted that pumping groundwater from the predominantly basin-fill unit would likely result in interference with the river that exceeds the 1.00 percent of the natural stream flow (80 percent exceedance) during some months. That is a major reason why groundwater needs to be obtained from the predominantly basalt unit only.

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 _____

System is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. Generally, a low transmissivity (low permeability) predominantly basin-fill sediment unit of varying thickness overlies a higher transmissivity (higher permeability) predominantly basalt unit. Available data indicates groundwater occurs in both the predominantly basin-fill sediment unit and the predominantly basalt unit and groundwater is vertically connected within each unit and vertically connected between each unit.

The proposed aquifer is the predominantly basin-fill sediment unit or the predominantly basalt unit below the basin-fill sediments. Geologic mapping (Walker 1963) indicates sedimentary deposits (Qts) at the well sites. This review include these sedimentary deposits as part of a more general predominantly basin fill sedimentary unit. Walker describes the Qts as composed of lacustrine, fluvatile, and aeolian sedimentary rocks, interstratified tuff, ashy diatomite, and unconsolidated clay, sand, silt, and gravel.

This review recommends requiring the wells to obtain groundwater solely from the predominantly basalt unit which might be first encountered below 500 or 600 feet depth or deeper based on water well reports for wells LAKE 1769 and LAKE 51282.

Hunt (2003) was used to calculate the interference given the recommended condition that the wells obtain groundwater from the predominantly basalt unit below the predominantly basin fill sediment unit. When obtaining groundwater from the predominant basalt unit, the calculated interference with the Crooked Creek and the Chewaucan River for each month remains less than 1.00 percent of the natural stream flow (80 percent exceedance). It should be noted that pumping groundwater from the predominantly basin-fill unit would likely result in interference with the creek and river that exceeds the 1.00 percent of the natural stream flow (80 percent exceedance) during some months. That is a major reason why groundwater needs to be obtained from the predominantly basalt unit only.

If a groundwater right permit is issued, the following conditions are recommended: 7B, 7F, 7N, 7T, and

Special well construction condition: "Each permitted well shall obtain groundwater solely from the predominantly basalt unit (which may contain some sedimentary layers) that underlies the predominantly basin-fill sediment unit (which may contain some basalt layers). Each well shall have continuous casing and continuous seal from land surface, through the predominantly basin-fill unit, and 5 feet into the predominantly basalt unit at minimum. Note: the depth to the predominantly basalt unit varies with location."

References Used: References consulted were:

Hampton, E.R., 1964, Geologic factors that control the occurrence and availability of ground water in the Fort Rock Basin, Lake County, Oregon: USGS Professional Paper 383-B, 29 p.

McFarland, W.D. and Ryals, G.N., 1991, Adequacy of available hydrogeologic data for evaluation of declining ground-water levels in the Fort Rock Basin, south-central Oregon: USGS Water Resources Investigations Report 89-4057, 47 p.

Miller, D.W., 1984, Appraisal of ground-water conditions in the Fort Rock Basin, Lake County, Oregon: OWRD Open File Report, 157 p.

Miller, D.W., 1986, Ground-water conditions in the Fort Rock Basin, northern Lake County, Oregon: OWRD Ground Water Report No. 31, 196 p.

Morgan, D.S., 1988, Geohydrology and numerical model analysis of ground-water flow in the Goose Lake Basin, Oregon and California: USGS Water Resources Investigations Report 87-4058, 92 p.

Oregon Water Resources Department, 1989, Goose and Summer Lakes Basin report: OWRD Basin Report, 112 p.

Peterson, N.V. and McIntyre, J.R., 1970, The reconnaissance geology and mineral resources of eastern Klamath County and western Lake County, Oregon: DOGAMI Bulletin 66, 70 p.

Phillips, K.N. and VanDenburgh, A.S., 1971, Hydrology and geochemistry of Abert, Summer, and Goose Lakes, and other closed-basin lakes in south-central Oregon: USGS Professional Paper 502-B, 86p.

Sammel, E.A. and Craig, R.W., 1981, The geothermal hydrology of Warner Valley, Oregon: a reconnaissance study: USGS Professional Paper 1044-I, 147 p.

Walker, G.W., 1963, Reconnaissance geologic map of the eastern half of the Klamath Falls (AMS) quadrangle, Lake and Klamath Counties, Oregon: USGS Mineral Investigations Field Studies Map MF-260.

Waring, G.A., 1908, Geology and water resources of a portion of south-central Oregon: USGS Water Supply Paper 220, 85 p.

Goose and Summer Lakes Basin Program rules (OAR 690-513).

Water well reports for wells LAKE 1769, LAKE 52274, LAKE 51282, LAKE 51294.

USGS quadrangle maps (1:24,000 scale): Valley Falls, Little Honey Creek, Coglan Buttes SE, Lake Abert South

D. WELL CONSTRUCTION, OAR 690-200D1. Well #: 1 & 2 Logid: Each are not yet drilledD2. **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:**

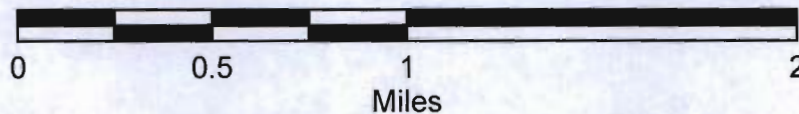
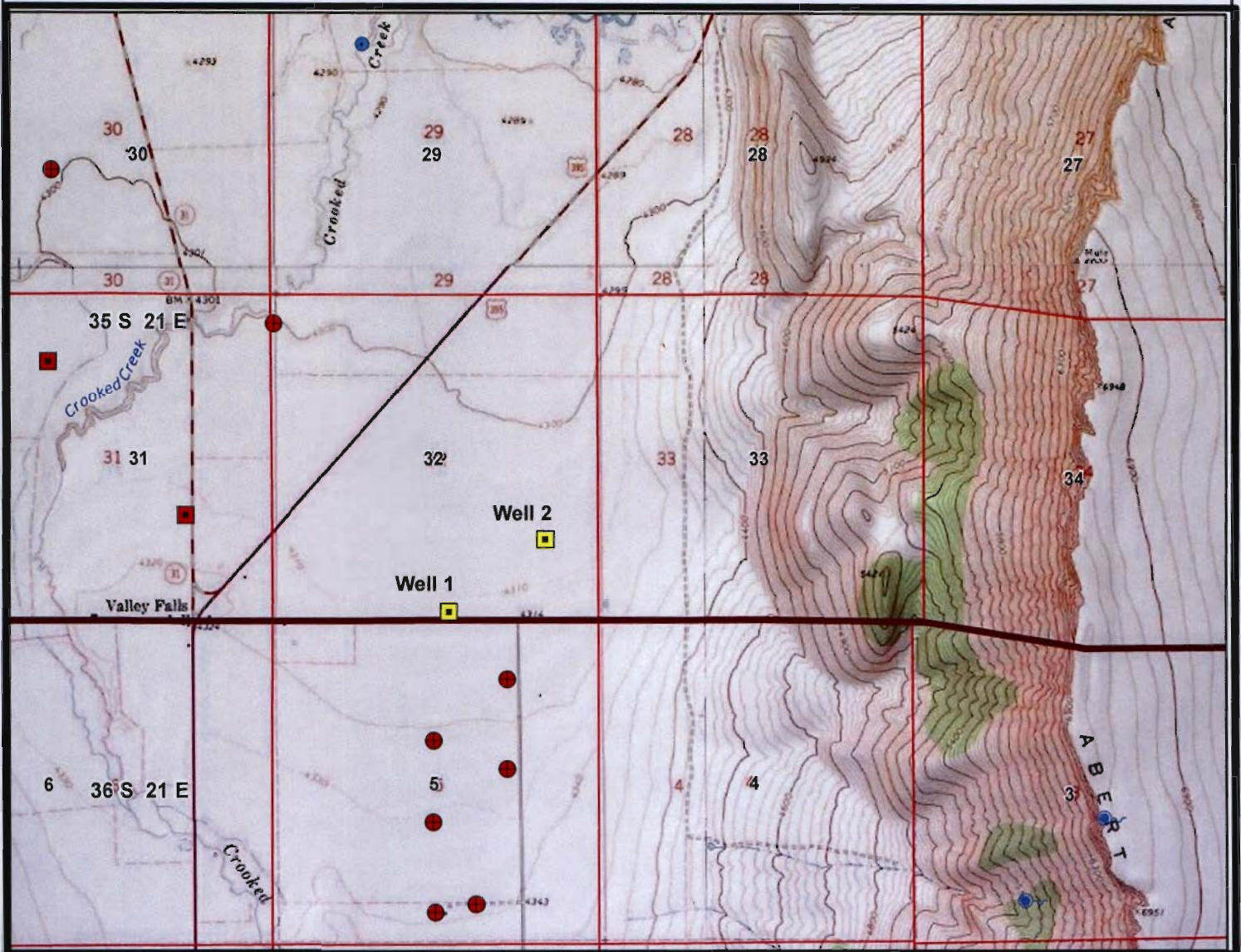
- a. ☐ constitutes a health threat under Division 200 rules;
b. ☐ commingles water from more than one ground water reservoir;
c. ☐ permits the loss of artesian head;
d. ☐ permits the de-watering of one or more ground water reservoirs;
e. ☐ other: (specify) _____

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.D6. ☐ **Route to the Enforcement Section.**

THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNELD7. ☐ 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).**

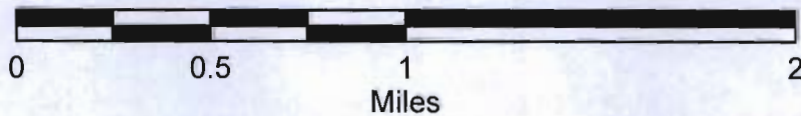
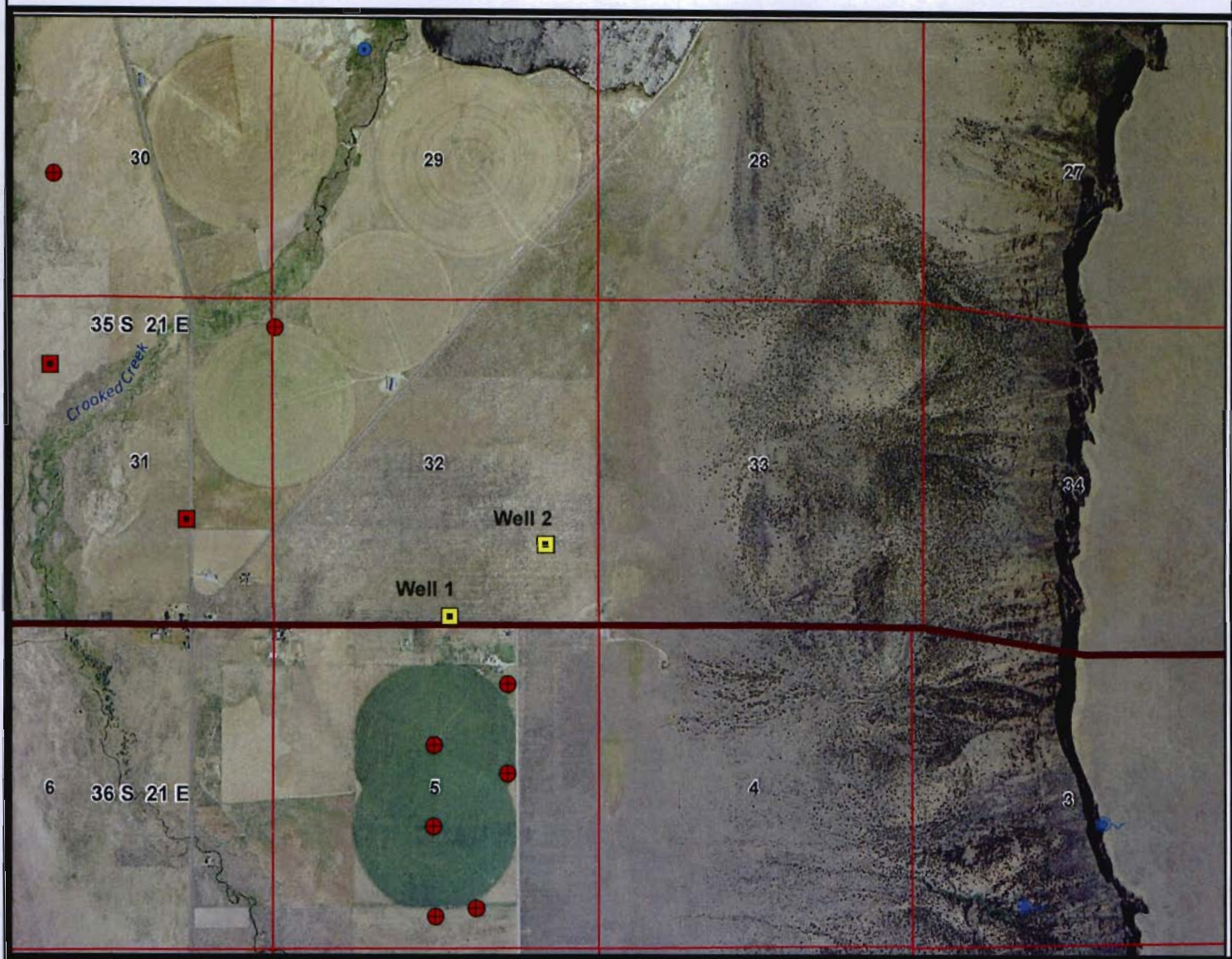
Groundwater Right Application G-17548 Schofield Family Limited Partnership



Yellow = Application Noted Well(s)
Red = Other Existing or Proposed Wells
Blue and Other = surface water rights



Groundwater Right Application G-17548 Schofield Family Limited Partnership

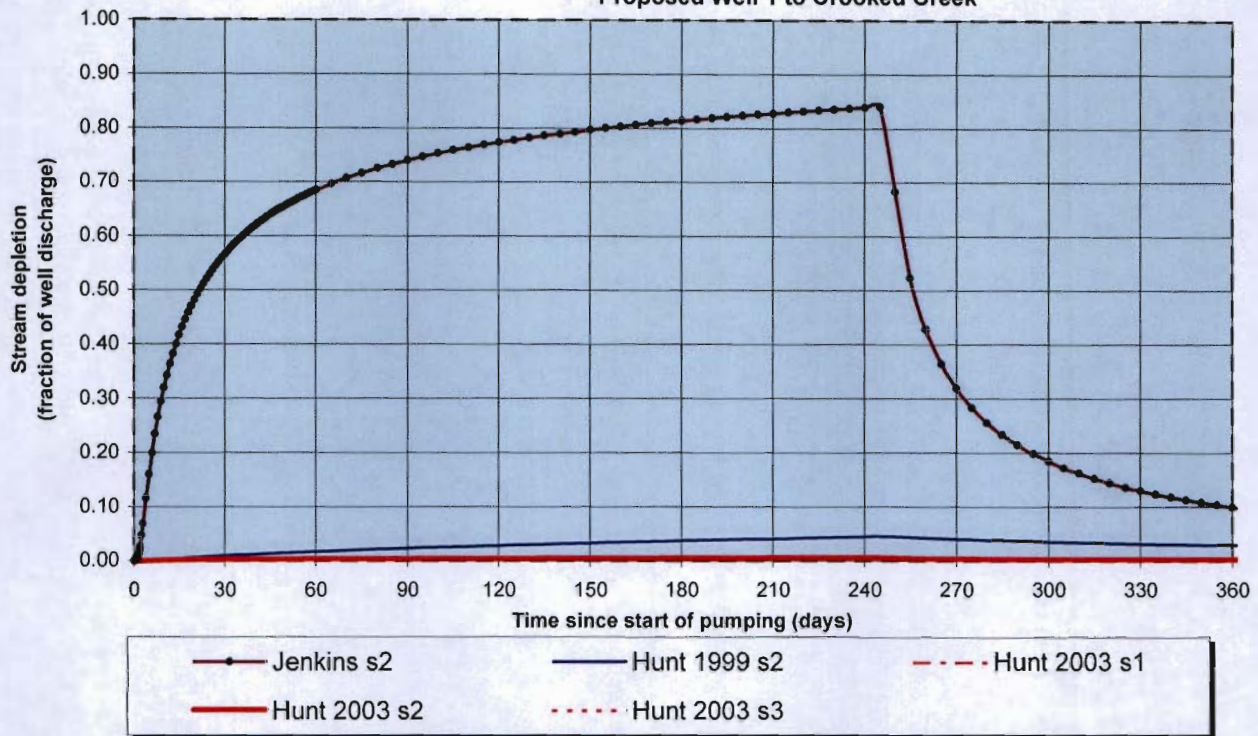


Yellow = Application Noted Well(s)
Red = Other Existing or Proposed Wells
Blue and Other = surface water rights



Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)

Proposed Well 1 to Crooked Creek

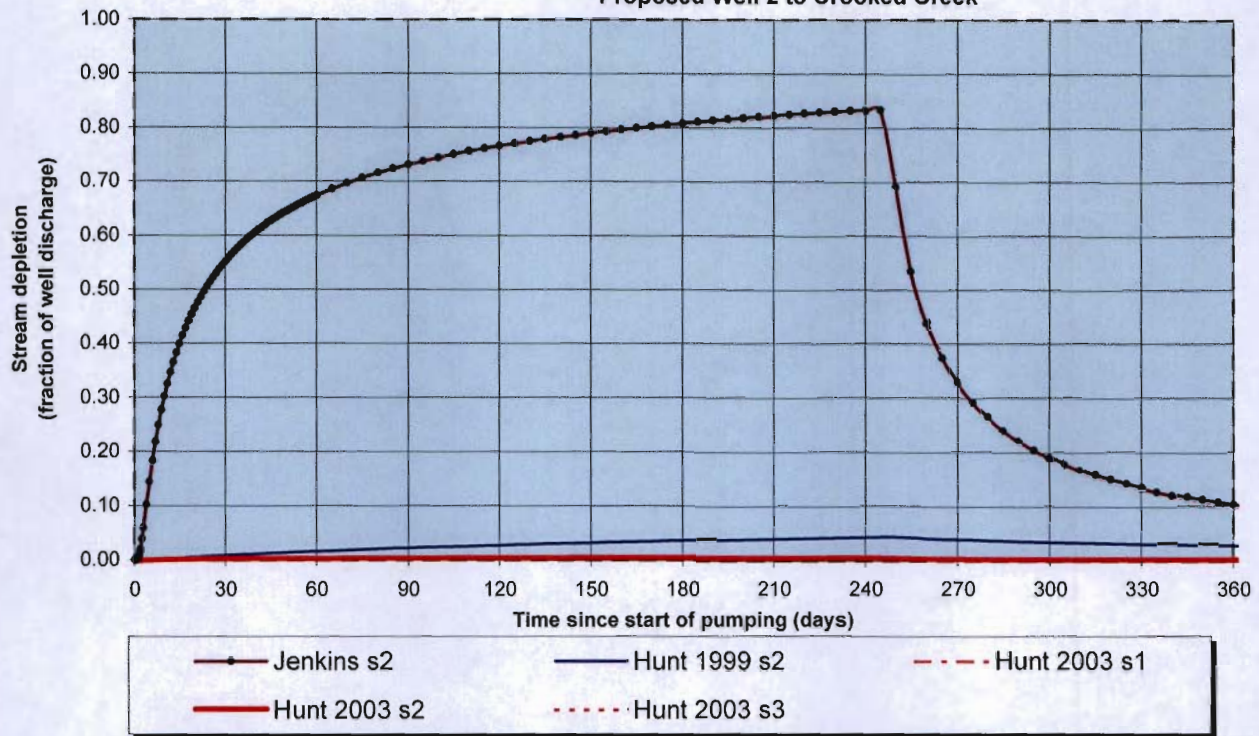


Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 245 days							
Days	30	60	90	120	150	180	210	240	270	300	330	360	
J SD	56.6%	68.5%	74.0%	77.4%	79.7%	81.5%	82.8%	83.9%	31.9%	18.4%	13.0%	9.9%	
H SD 1999	0.9%	1.7%	2.3%	2.9%	3.3%	3.7%	4.1%	4.5%	4.0%	3.5%	3.2%	2.9%	
H SD 2003	0.3%	0.4%	0.4%	0.5%	0.5%	0.6%	0.6%	0.6%	0.4%	0.4%	0.3%	0.3%	
Qw, cfs	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	
H SD 99, cfs	0.008	0.014	0.019	0.023	0.027	0.030	0.033	0.036	0.032	0.028	0.026	0.024	
H SD 03, cfs	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.003	0.003	0.003	0.003	

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.80	0.80	0.80	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	5450	5450	5450	ft
Well depth	d	600	600	600	ft
Aquifer hydraulic conductivity	K	30	30	30	ft/day
Aquifer saturated thickness	b	500	500	500	ft
Aquifer transmissivity	T	15000	15000	15000	ft*ft/day
Aquifer storativity or specific yield	S	0.01	0.01	0.01	
Aquitard vertical hydraulic conductivity	Kva	0.3	0.3	0.3	ft/day
Aquitard saturated thickness	ba	350	350	350	ft
Aquitard thickness below stream	babs	350	350	350	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	100	100	100	ft
Streambed conductance (lambda)	sbc	0.085714	0.085714	0.085714	ft/day
Stream depletion factor	sdf	19.801667	19.801667	19.801667	days
Streambed factor	sbf	0.031143	0.031143	0.031143	
input #1 for Hunt's Q_4 function	t'	0.050501	0.050501	0.050501	
input #2 for Hunt's Q_4 function	K'	1.697286	1.697286	1.697286	
input #3 for Hunt's Q_4 function	epsilon'	0.050000	0.050000	0.050000	
input #4 for Hunt's Q_4 function	lamda'	0.031143	0.031143	0.031143	

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)

Proposed Well 2 to Crooked Creek

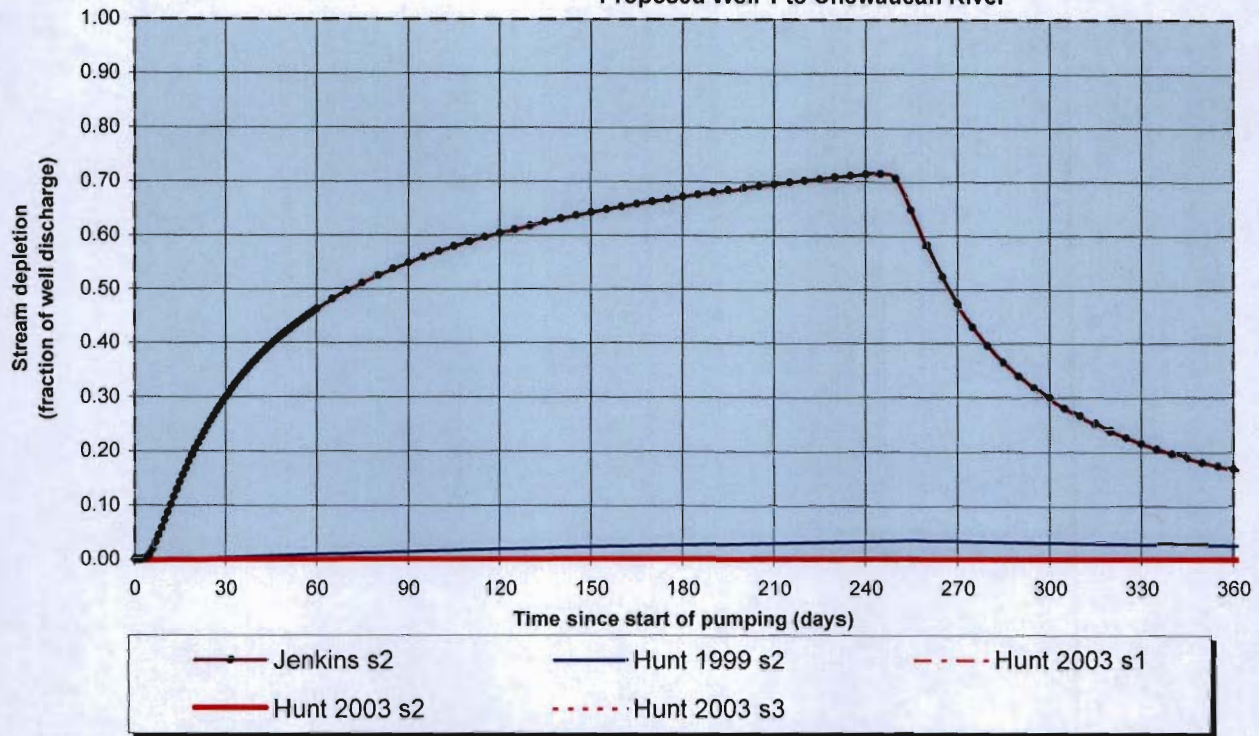


Output for Stream Depletion, Scenerio 2 (s2):							Time pump on (pumping duration) = 245 days					
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	55.1%	67.4%	73.1%	76.6%	79.0%	80.8%	82.2%	83.3%	32.8%	19.1%	13.4%	10.3%
H SD 1999	0.9%	1.7%	2.3%	2.8%	3.3%	3.7%	4.1%	4.4%	4.0%	3.5%	3.2%	2.9%
H SD 2003	0.3%	0.4%	0.4%	0.4%	0.5%	0.5%	0.6%	0.6%	0.4%	0.3%	0.3%	0.3%
Qw, cfs	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
H SD 99, cfs	0.007	0.013	0.018	0.023	0.026	0.030	0.033	0.036	0.032	0.028	0.026	0.024
H SD 03, cfs	0.002	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.003	0.003	0.003	0.003

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.80	0.80	0.80	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	5650	5650	5650	ft
Well depth	d	600	600	600	ft
Aquifer hydraulic conductivity	K	30	30	30	ft/day
Aquifer saturated thickness	b	500	500	500	ft
Aquifer transmissivity	T	15000	15000	15000	ft*ft/day
Aquifer storativity or specific yield	S	0.01	0.01	0.01	
Aquitard vertical hydraulic conductivity	Kva	0.3	0.3	0.3	ft/day
Aquitard saturated thickness	ba	350	350	350	ft
Aquitard thickness below stream	babs	350	350	350	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	100	100	100	ft
Streambed conductance (lambda)	sbc	0.085714	0.085714	0.085714	ft/day
Stream depletion factor	sdf	21.281667	21.281667	21.281667	days
Streambed factor	sbfc	0.032286	0.032286	0.032286	
input #1 for Hunt's Q_4 function	t'	0.046989	0.046989	0.046989	
input #2 for Hunt's Q_4 function	K'	1.824143	1.824143	1.824143	
input #3 for Hunt's Q_4 function	epsilon'	0.050000	0.050000	0.050000	
input #4 for Hunt's Q_4 function	lamda'	0.032286	0.032286	0.032286	

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)

Proposed Well 1 to Chewaucan River

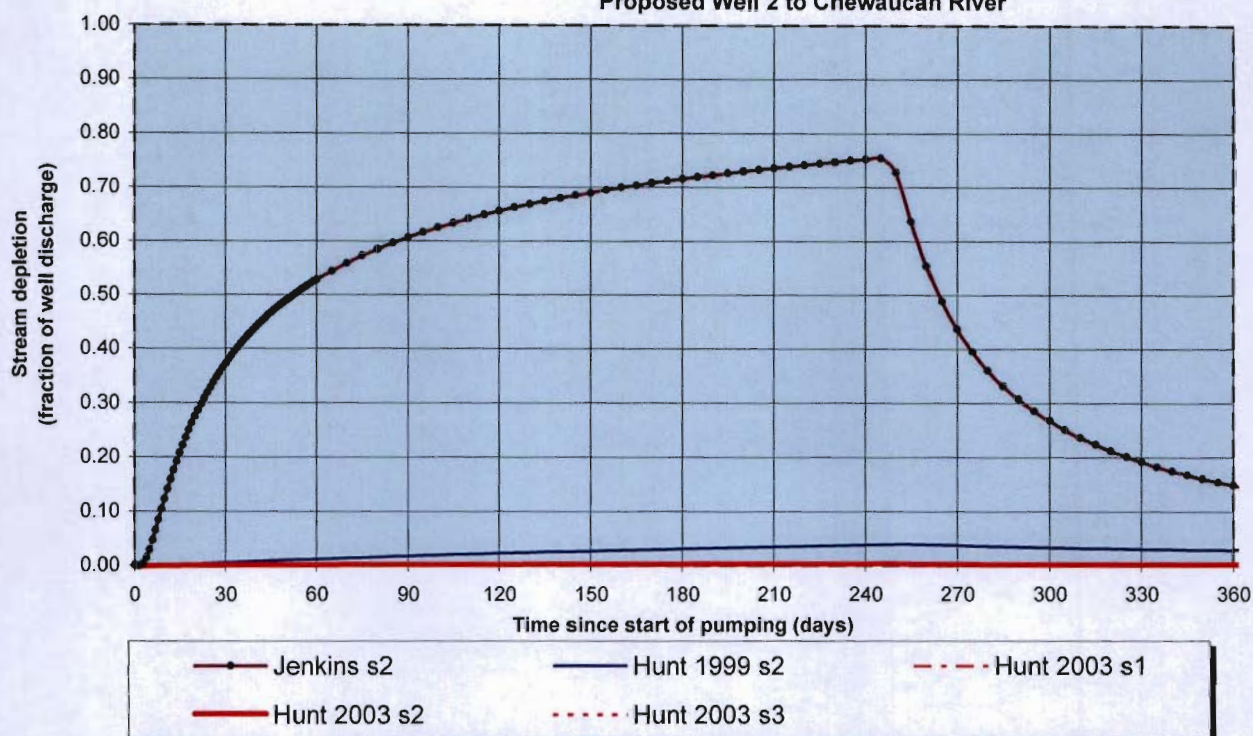


Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 245 days							
Days	30	60	90	120	150	180	210	240	270	300	330	360	
J SD	30.0%	46.3%	54.9%	60.4%	64.3%	67.2%	69.5%	71.4%	47.4%	29.9%	21.7%	16.8%	
H SD 1999	0.4%	1.0%	1.5%	2.0%	2.5%	2.9%	3.2%	3.6%	3.6%	3.3%	3.0%	2.8%	
H SD 2003	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	
Qw, cfs	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	
H SD 99, cfs	0.003	0.008	0.012	0.016	0.020	0.023	0.026	0.028	0.029	0.026	0.024	0.022	
H SD 03, cfs	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.80	0.80	0.80	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	9840	9840	9840	ft
Well depth	d	600	600	600	ft
Aquifer hydraulic conductivity	K	30	30	30	ft/day
Aquifer saturated thickness	b	500	500	500	ft
Aquifer transmissivity	T	15000	15000	15000	ft*ft/day
Aquifer storativity or specific yield	S	0.01	0.01	0.01	
Aquitard vertical hydraulic conductivity	Kva	0.3	0.3	0.3	ft/day
Aquitard saturated thickness	ba	350	350	350	ft
Aquitard thickness below stream	babs	350	350	350	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	100	100	100	ft
Streambed conductance (lambda)	sbc	0.085714	0.085714	0.085714	ft/day
Stream depletion factor	sdf	64.550400	64.550400	64.550400	days
Streambed factor	sbfb	0.056229	0.056229	0.056229	
input #1 for Hunt's Q_4 function	t'	0.015492	0.015492	0.015492	
input #2 for Hunt's Q_4 function	K'	5.532891	5.532891	5.532891	
input #3 for Hunt's Q_4 function	epsilon'	0.050000	0.050000	0.050000	
input #4 for Hunt's Q_4 function	lamda'	0.056229	0.056229	0.056229	

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)

Proposed Well 2 to Chewaucan River



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 245 days							
Days	30	60	90	120	150	180	210	240	270	300	330	360	
J SD	37.3%	52.8%	60.7%	65.6%	69.0%	71.6%	73.6%	75.3%	43.8%	26.8%	19.2%	14.8%	
H SD 1999	0.5%	1.2%	1.8%	2.3%	2.7%	3.1%	3.5%	3.8%	3.7%	3.4%	3.1%	2.9%	
H SD 2003	0.1%	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.4%	0.3%	0.2%	0.2%	0.2%	
Qw, cfs	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	
H SD 99, cfs	0.004	0.010	0.014	0.018	0.022	0.025	0.028	0.031	0.030	0.027	0.025	0.023	
H SD 03, cfs	0.001	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.002	

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.80	0.80	0.80	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	8460	8460	8460	ft
Well depth	d	600	600	600	ft
Aquifer hydraulic conductivity	K	30	30	30	ft/day
Aquifer saturated thickness	b	500	500	500	ft
Aquifer transmissivity	T	15000	15000	15000	ft*ft/day
Aquifer storativity or specific yield	S	0.01	0.01	0.01	
Aquitard vertical hydraulic conductivity	Kva	0.3	0.3	0.3	ft/day
Aquitard saturated thickness	ba	350	350	350	ft
Aquitard thickness below stream	babs	350	350	350	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	100	100	100	ft
Streambed conductance (lambda)	sbc	0.085714	0.085714	0.085714	ft/day
Stream depletion factor	sdf	47.714400	47.714400	47.714400	days
Streambed factor	sbf	0.048343	0.048343	0.048343	
input #1 for Hunt's Q_4 function	t'	0.020958	0.020958	0.020958	
input #2 for Hunt's Q_4 function	K'	4.089806	4.089806	4.089806	
input #3 for Hunt's Q_4 function	epsilon'	0.050000	0.050000	0.050000	
input #4 for Hunt's Q_4 function	lamda'	0.048343	0.048343	0.048343	