Groundwater Application Review Summary Form

Application # G- 18604

GW Reviewer Aurora Bouchier Date Review Completed: 3/7/2018

Summary of GW Availability and Injury Review:

[ ] Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

[ ] There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

[ ] The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

The land already has a supp. irr. water right for gw out of the same well.

WATER RESOURCES DEPARTMENT

MEMO 3/7, 2018

TO: **Application G-** 18604

FROM: **GW:** Aurora Bouchier
(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 Groundwater 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 Groundwater 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 _____ 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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date March 7, 2018

FROM: Groundwater Section Aurora C Bouchier
Reviewer's Name

SUBJECT: Application G- 18604 Supersedes review of na
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 groundwater 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: **Shotgun Ranch, LLC** County: **Crook**

A1. Applicant(s) seek(s) 0.25 cfs from 1 well(s) in the Deschutes Basin, Cooked River subbasin (Drake Butte quad)

A2. Proposed use storage & sup irr (41 acres) Seasonality: Storage: 2/15-4/15, Sup Irr: 4/15-10/15

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	CROO 54453	#4	bedrock	0.25	17S/20E-4 Se-SE	1180' N, 5' W fr SE cor S 4
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	3475	160	18*	12/27/2016	500	0-50	-1.5-50	12-500	~160-480	50	**na**	A

Use data from application for proposed wells.

A4. **Comments:** *A 2/22/2017 permit condition water level of 395 feet bls was submitted. This is prior to any reported pumping at this well.
The application is for supplemental irrigation of 41acres and storage. The acres in question already have a supplemental irrigation right (app G-18112/permit G-17700) for 0.386 cfs of groundwater from the same well, and a primary irrigation right for surface water under T-11750. It is not clear if this application is requesting an additional 0.25 cfs to double up on the supplemental irrigate of the property, or if the request is for storage.

A5. ☒ **Provisions of the** Deschutes Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, *or* ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: The proposed well site is located outside the USGS Deschutes Ground Water Study Area.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: _____
Comments: _____

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* 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 groundwater 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 groundwater 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 groundwater resource; or

d. ☒ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
   i. ☒ The permit should contain condition #(s) **7N and 7J**;
   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 groundwater production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;

c. ☐ **Condition** to allow groundwater production only from the _____ groundwater 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 Groundwater 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. **Groundwater availability remarks:** _____

Condition with 7N and 7J.

The well logs of nearby wells (CROO 336, CROO 459, CROO 2825/2824, and CROO 2841) report higher than expected yields for wells producing from the Clarno Formation. The pump test for CROO 2825/2824, constructed in the Clarno Formation, likely indicates a limited supply due to the large drawdown. The confined condition described on the well logs for CROO 336, CROO 459, and CROO 2841 may indicate that produced water is coming out of storage, the long term capacity of this resource is not known.

The driller lists a yield of 50 gpm during an air test. The well log lists a static water level of 18 feet on 12/27/2016, and the first static water level supplied under permit condition is 395 feet on 2/22/2017 using an airline. If the airline measurement is accurate it seems extremely unlikely that the well will be capable of producing the rate for which the well is already authorized for any significant duration.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**Bedrock**	☒	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Groundwater flow systems in the Clarno volcanics are presumably in secondary fractures which are likely semi-confined, given the reported age of the material. Well logs for some nearby wells (up to 13 miles away in a straight line up the Crooked River) report static water levels above the water bearing zones (CROO 2841, CROO 459, and CROO 336), indicating confined conditions. The well log for CROO 2825 (~4.5 miles down the Crooked River) reports a static water level roughly equal to the depth at which water was first encountered, indicating the flow system is likely unconfined, at least locally. Nearby domestic wells (CROO 2827 and CROO 2828) were constructed to produce water from both a shallow alluvial aquifer and flow zones within the bedrock aquifer, so it is difficult to determine if locally the bedrock is confined, semi-confined, or unconfined.

The well log lists a static water level of 18 feet bls and a water-bearing zone at 160 to 238 feet bls. The first static water level provided under permit G-17700 has a static water level of 395 feet below land surface.

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? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	**1**	**Drake & Wildcat Creeks**	**~3450**	**3400-3722**	**1320**	☒	☐	☐	☐	☒
1	**2**	**Crooked River**	**~3450**	**3392-3408**	**2535**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: The elevation of the hydraulic head in nearby wells is coincident or above the surface water elevation. The Crooked River likely represents a regional hydrologic sink.

Water Availability Basin the well(s) are located within: 70353: CROOKED R> DESCHUTES R- AB SAND CR

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?
1	**1**	☐	☐	**-**	**-**	☐	**-**	☐	**See comments**	☐
1	**2**	☐	☐	**70353**	**47.80**	☒	**38.70**	☒	**See comments**	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: Pumping from the well will likely impact surface water along the creeks and the Crooked River. However, the nature of the aquifer system precludes the use of available analytical models to evaluate the timing of interference.

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: : Pumping from the well will likely impact surface water along the creeks and the Crooked River. However, the nature of the aquifer system precludes the use of available analytical models to evaluate the timing of interference.

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 groundwater 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:**

If a permit is issued, condition with 7N nad 7J.

References Used:

Application File: G-18604, and underlying files G-18112 and T-11750 (surface water).

Drake Butte quadrangle map (USGS map, 1:24,000 scale).

Gonthier, J.B. 1985. A description of aquifer units in eastern Oregon: U.S. Geological Survey Water Resources Investigations Report 84-4095, 39 p., maps.

OWRD Groundwater Review for Application File: G-17412.

Swanson, D.A. 1969. Reconnaissance geologic map of the east half of the Bend quadrangle, Crook, Wheeler, Jefferson, Wasco, and Deschutes Counties, Oregon: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-568.

Walker, G. W. (editor) 1990. Geology of the Blue Mountains region of Oregon, Idaho, and Washington; Cenozoic geology of the Blue Mountains region: U.S. Geological Survey Professional Paper 1437, 135 p.

Waters, A. C. 1968. Reconnaissance Geologic map of the Post quadrangle, Crook County Oregon: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-542.

Well logs for CROO 54453 and nearby CROO 336, CROO 459, CROO 2825/2824, CROO 2827, CROO 2828, and CROO 2841.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** _____ **Logid:** _____

D2. **THE WELL does not appear to 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 or other comment is described as follows:** _____

D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

WATER AVAILABILITY TABLE

CROOKED R > DESCHUTES R - AB SAND CR
Basin: DESCHUTES

Watershed ID #: 70353 Exceedance Level: 80
Time: 3:18 PM Date: 03/07/2018

# Nest	Watershed ID Number	Stream Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	STOR
1	70087	DESCHUTES R > COLUMBIA R - AB MOUTH AT GAGE 14103000	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES
2	30530627	DESCHUTES R > COLUMBIA R - AB EAGLE CR	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES
3	30530643	DESCHUTES R > COLUMBIA R - AB SHITIKE CR	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES
4	30530508	CROOKED R > DESCHUTES R - AB OSBORNE CAN	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
5	30530507	CROOKED R > DESCHUTES R - AB DRY R	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
6	70353	CROOKED R > DESCHUTES R - AB SAND CR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

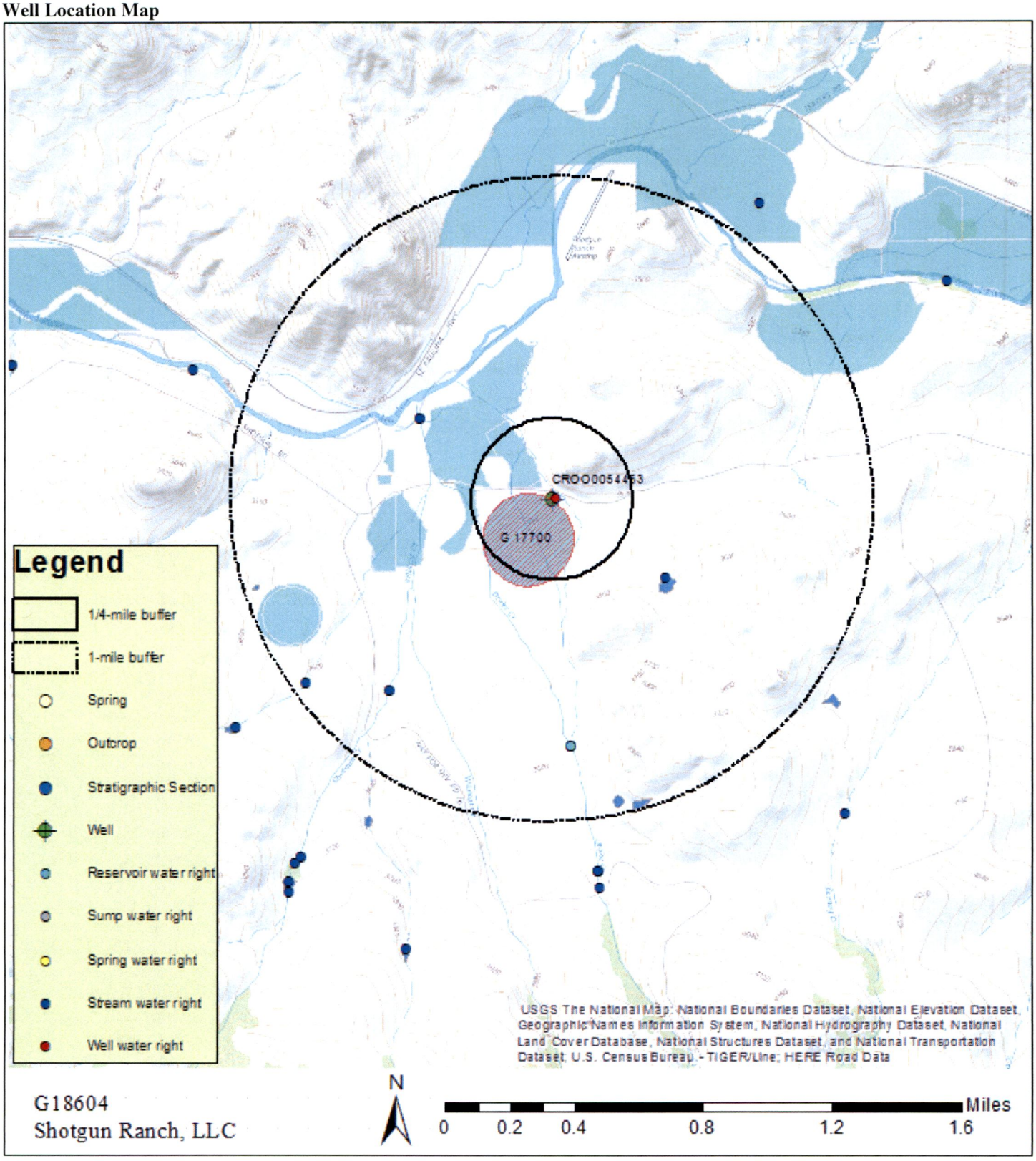
CROOKED R > DESCHUTES R - AB SAND CR
Basin: DESCHUTES

Watershed ID #: 70353 Exceedance Level: 80
Time: 3:17 PM Date: 03/07/2018

Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
JAN	78.90	7.74	71.20	0.00	50.00	21.20
FEB	175.00	15.50	160.00	0.00	75.00	84.50
MAR	337.00	145.00	192.00	0.00	113.00	79.10
APR	598.00	332.00	266.00	0.00	113.00	153.00
MAY	404.00	370.00	34.20	0.00	113.00	-78.80
JUN	261.00	295.00	-34.50	0.00	75.00	-109.00
JUL	80.10	85.00	-4.86	0.00	50.00	-54.90
AUG	38.70	43.20	-4.47	0.00	47.80	-52.30
SEP	45.20	44.80	0.37	0.00	50.00	-49.60
OCT	47.30	22.90	24.40	0.00	50.00	-25.60
NOV	60.60	3.44	57.20	0.00	50.00	7.16
DEC	76.50	5.50	71.00	0.00	50.00	21.00
ANN	223,000	82,800	140,000	0	50,500	101,000

Well Location Map



Water-Level Trends in Well