Groundwater Application Review Summary Form

Application # G- 19144

GW Reviewer Phillip I. Marcy Date Review Completed: 06/25/2021

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).

WATER RESOURCES DEPARTMENT

MEMO **_June 25, 2021_**

TO: **Application** G-**_19144_**

FROM: **GW:** **_Phil Marcy_**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ **YES**
☒ **NO** The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ **YES**
☒ **NO** Use the Scenic Waterway Condition (Condition 7J)

☐ 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 _[Enter]_ 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 06/25/2021
FROM: Groundwater Section Phillip I. Marcy
Reviewer's Name
SUBJECT: Application G- **19144** 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 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: **John Wirth** County: **Baker**

A1. Applicant(s) seek(s) 8.0 cfs from 3 well(s) in the Powder Basin, subbasin

A2. Proposed use Irrigation (111.8 acres); Supplemental Irrigation (667.0 acres) Seasonality: March 1st – October 31st (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	Proposed	1	Alluvium	8.0	7S/41E-7 SW-SE	795' N, 1425' W fr SE cor S 13
2	Proposed	2	Alluvium	8.0	7S/41E-7 SW-SE	885' N, 1508' W fr SE cor S 13
3	Proposed	3	Alluvium	8.0	7S/41E-7 SW-SE	700' N, 1340' W fr SE cor S 13
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	3369	Unk	Unk	NA	300	0-50	0-50	NA	50-300	Unk	NA	NA
2	3376	Unk	Unk	NA	300	0-50	0-50	NA	50-300	Unk	NA	NA
3	3377	Unk	Unk	NA	300	0-50	0-50	NA	50-300	Unk	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The applicant proposes to produce groundwater from alluvium, however the nearest wells located report broken rock at depths shallower than the case and seal depth of proposed POA wells. The broken rock reported is likely Clover Creek Greenstone of Gilluly (1937), mapped here by Brooks (1977). The upland area where the proposed POA wells are located appears to have a relatively thin mantle of sediment overlying the fractured bedrock, based on available data.

The proposed rate is lower than the duty of 1/80th cfs per acre, when considering Primary and Supplemental acreage (778.8 acres = 9.735 cfs).

A5. ☒ **Provisions of the** Powder 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:

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; "Large Water Use Reporting"**;

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:** There is little groundwater development, hence little groundwater data for this area. There are only two located wells within one mile of the proposed POAs. Two wells about 1.5 miles from the POA wells have a handful of permit condition measurements that suggest groundwater levels are reasonably stable for their period of record (see hydrograph).

Nearby wells produce groundwater from a combination of alluvium and fractured bedrock, and there is no data available that suggests these two lithologies are hydraulically isolated from one another. Based upon local well reports, groundwater under confining pressure typically migrates upward through fractures in what are otherwise low-permeability lithologies. These fractured rocks have been targeted as productive water-bearing zones for usable quantities of groundwater in the majority of wells in the area.

In our conceptual model, the cone of depression induced by pumping at the proposed POA locations is anticipated to lower the piezometric surface of groundwater in the surrounding materials. As pumping commences, this groundwater surface may decline below the elevation where it typically intersects the land surface, resulting in loss of discharge at springs and seeps. In the area near the proposed POAs, these natural discharge points are plentiful and have historically been a source of water for irrigation and livestock watering.

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	**Fractured Bedrock**	☒	☐
2	**Fractured Bedrock**	☒	☐
3	**Fractured Bedrock**	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: Nearby well reports indicate that groundwater encountered at depth within the succession of fractured rock rises well above the elevation at which it is first encountered. It is anticipated that the degree of confinement varies locally due to vertical permeability being primarily controlled by the presence or absence of secondary porosity caused by fractures within low-permeability rock.

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
1-3	**1**	**SPRG 178, supplying Certificates 74267, 65716, 70194**	**~3320**	**3311**	**1385-1420**	☒	☐	☐	☐	☐
1-3	**2**	**Spring/sump supplying Certificate 65159**	**~3320**	**3244**	**4020-4110**	☒	☐	☐	☐	☐
1-3	**3**	**SPRG 175, supplying Certificate 74268**	**~3320**	**3320-3330**	**2160-2370**	☒	☐	☐	☐	☐
1-4	**4**	**SPRG 174, supplying Certificate 74267**	**~3320**	**3240-3250**	**3970-4175**	☒	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: The geologic framework underlying the proposed POA wells is composed of fractured bedrock, in which the fractures provide the most efficient pathways for movement of groundwater. In this scenario, there does not exist a laterally continuous barrier to this movement toward land surface. Springs within one mile of the proposed POA locations are an expression of groundwater discharging at the surface where these efficient pathways intersect the surface topography. In this area, several of these springs, and resulting intermittent streams are authorized as POAs for surface water rights, and it is anticipated that pumping at the proposed locations and depths will impact the volume and duration of spring discharge at these locations. In lieu of groundwater level measurements for the POA wells, groundwater elevations were estimated by comparisons of nearby logs which typically report static water levels 10-30' below land surface. Certificates 74267 and 74268 belong to the applicant, 70194, 65716, and 65159 belong to other users.

Water Availability Basin the well(s) are located within: Powder R > Snake R – AB Goose Creek

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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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	**1-4**	☐	☒			☐		☐	**<25%**	☒
2	**1-4**	☐	☒			☐		☐	**<25%**	☒
3	**1-4**	☐	☒			☐		☐	**<25%**	☒
		☐	☐			☐		☐		☐

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 proposed pumping rate is greater than 5 cfs and hydraulically connected to surface springs within one mile. Though water discharged from mapped and unmapped springs and seeps is thought to inevitably reach perennial surface waters through shallow subsurface or deeper fracture flow, this confluence does not occur within one mile of the proposed POA locations. Therefore, PSI has been triggered due to the hydrologic relationship with spring discharges within one mile. No appropriate model is available to accurately predict interference with surface water at 30 days due to geologic complexity and lack of data concerning aquifer properties. Considering the degree of confinement suggested by nearby well logs, groundwater discharged to wells and springs in this area likely emerges from deep flow paths, migrating toward the surface where preferential flow paths exist. Without further information, it is assumed that impacts to surface springs by additional groundwater pumping will take place over longer time periods, and not reach the 25% criteria within 30 days.

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													
(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:

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:** PSI has been triggered for the proposed use, due to a proposed pumping rate greater than 5 cfs from a groundwater source that hydraulically connected to surface water sources within one mile. As previously stated, the PSI determination does not include interference with perennial streams outside of one mile from the proposed POA locations.

Due to the possibility of impacts to spring discharge by the proposed pumping, if a permit is issued it shall be conditioned to protect these senior water rights if impacts are observed, by cessation or curtailment of pumping until flows are restored.

References Used:

Brooks, H.C., Bowen, R.G., 1977, Preliminary geologic map of the Keating NW quadrangle, Oregon, Open-File Report O-77-1(b), Oregon Department of Geology and Mineral Industries, Portland, OR., map scale 1:24,000.

Gilluly, J., 1937, Geology and mineral resources of the Baker quadrangle, Oregon, USGS Bulletin 879, U.S. Geological Survey, map scale 1:125,000.

Application review for G-17758

GWIS water level database, GRID well log database

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

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

POWDER R > SNAKE R - AB GOOSE CR

Watershed ID #: 72192 Basin: POWDER Exceedance Level: 80

Time: 5:38 PM Date: 06/08/2021

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
		Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.				
JAN	76.20	118.00	-41.90	6.37	50.00	-98.30
FEB	128.00	139.00	-10.80	20.60	60.00	-91.40
MAR	254.00	218.00	36.00	61.60	70.00	-95.60
APR	580.00	416.00	164.00	251.00	70.00	-157.00
MAY	800.00	1,010.00	-205.00	140.00	70.00	-416.00
JUN	620.00	1,070.00	-452.00	0.00	70.00	-522.00
JUL	210.00	578.00	-368.00	0.00	50.00	-418.00
AUG	110.00	356.00	-246.00	0.00	50.00	-296.00
SEP	75.70	275.00	-199.00	0.00	50.00	-249.00
OCT	73.60	96.30	-22.70	4.67	50.00	-77.40
NOV	80.20	73.70	6.49	5.56	50.00	-49.10
DEC	85.80	133.00	-46.90	6.14	50.00	-103.00
ANN	287,000	271,000	67,600	29,900	41,600	20,000

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

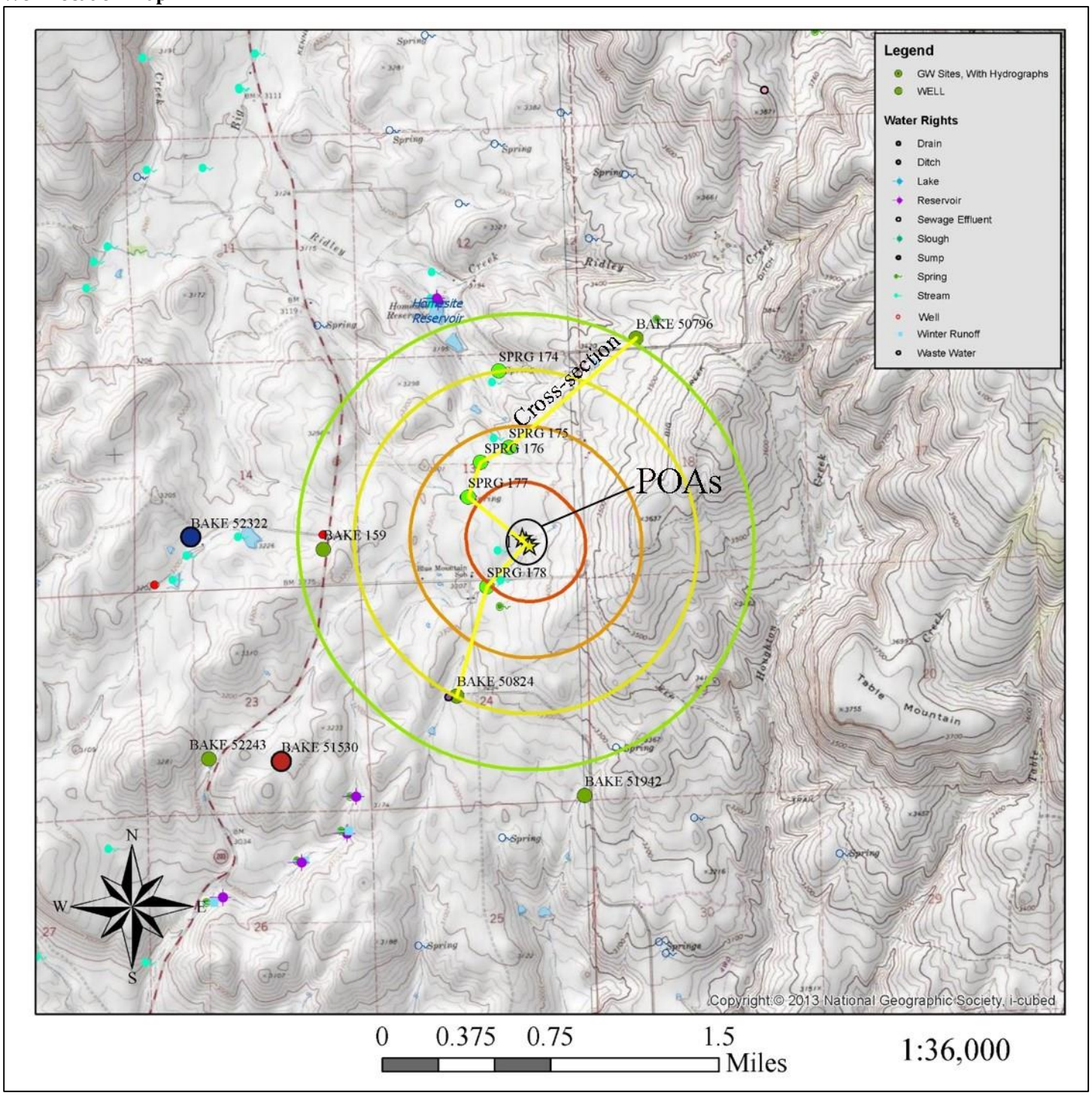
BIG CR > POWDER R - AT MOUTH

Watershed ID #: 72167 Basin: POWDER Exceedance Level: 80

Time: 5:40 PM Date: 06/08/2021

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
		Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.				
JAN	5.06	0.30	4.76	0.00	3.00	1.76
FEB	10.00	0.53	9.47	0.00	5.00	4.47
MAR	21.10	1.60	19.50	0.00	9.00	10.50
APR	58.60	24.10	34.50	0.00	9.00	25.50
MAY	58.20	67.50	-9.29	0.00	9.00	-18.30
JUN	18.40	20.90	-2.46	0.00	9.00	-11.50
JUL	3.18	8.82	-5.64	0.00	3.00	-8.64
AUG	1.80	3.85	-2.05	0.00	3.00	-5.05
SEP	1.61	2.06	-0.45	0.00	3.00	-3.45
OCT	1.95	1.39	0.56	0.00	3.00	-2.44
NOV	3.01	0.20	2.81	0.00	3.00	-0.19
DEC	4.49	0.24	4.25	0.00	3.00	1.25
ANN	21,800	7,980	14,000	0	3,740	11,000

Well Location Map



Water-Level Measurements in Nearby Wells