

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 65-23669
Exam Date: 08/27/2019

1. Current Owner:

MARION D GROOTHUIS 12926 NORWOOD ROAD DONNELLY ID 83615-5027 AND
JUDY L GROOTHUIS 12926 NORWOOD RD DONNELLY ID 83615-5027

2. Accompanied by: Owner

Phone No: 208-850-0617

3. **SOURCE:**

GROUND WATER

Method of Determination: Aerial imagery, GPS

B. OVERLAP REVIEW

1. Other water rights with the same place of use: Only overlaps with domestic uses with nominal POU designations.
2. Other water rights with the same point-of-diversion: NO Overlap

C. DIVERSION AND DELIVERY SYSTEM1. **LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER NE¼ SE¼, Sec. 20, Twp 16N, Rge 03E, B.M. VALLEY County

Method of Determination: Aerial photos, field observation

PLACE OF USE: IRRIGATION

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
16N	03E	20				6									14			1	21

Total Acres: 21

Method of Determination: Aerial imagery, tax lots, PLS

3.

Delivery System Diagram Attached (required). Indicate all major components and distances between components.

Yes Indicate weir size/pipe as applicable.

Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be

Yes 1:24,000 or greater.

Yes Aerial Photo Attached (required for irrigation of 10+ acres).

Yes Photo of Diversion and System Attached

4.

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
D0067343	Unknown	10	Unknown	Unknown	

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Flowmeter	Ultrasonic	GE Panametrics	PT878			

2. Measurements:

One measurement near pump with small pivot (southern pivot) running. Large pivot measurement made at pivot due to difficulty with entrained air while measuring at the pump.

E. FLOW CALCULATIONS

Measured Method: GE Panametric

Large Pivot:

MINUTE	VOLUME (CFS)	TOTAL GALLONS	RESULTS	
0	0.308	230307.7963	Gallons pumped	1384.06
1	0.308	230440.5605	Test duration (min)	10
2	0.307	230585.4063	Flow rate (gpm)	138.41
3	0.307	230719.4298	Flow rate (cfs)	0.30
4	0.307	230857.5921		
5	0.307	230990.9137		
6	0.307	231137.7631		
7	0.307	231275.1512		
8	0.307	231405.0809		
9	0.307	231549.4094		
10	0.307	231691.8545		

Small Pivot:

MINUTE	VOLUME (CFS)	TOTAL GALLONS	RESULTS	
0	0.138	228804.288	Gallons pumped	526.94
1	0.131	228861.743	Test duration (min)	9
2	0.131	228920.370	Flow rate (gpm)	58.55
3	0.130	228980.937	Flow rate (cfs)	0.13
4	0.130	229039.178		
5	0.127	229098.054		
6	0.130	229156.539		
7	0.127	229217.610		
8	0.128	229272.346		
9	0.131	229331.225		

Permitted rate: 0.48 cfs

Max rate based on standard diversion: 0.42 cfs

Max measured rate: 0.30 cfs

Recommended rate: 0.30 cfs

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation:

$$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 21 \text{ ac} \times 3.0 \text{ afa/yr} = 63 \text{ af/yr}$$

$$V_{DR} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = 0.30 \text{ cfs} \times 200 \text{ days} \times 1.9835 = 119 \text{ af/yr}$$

$$V = \text{Smaller of } V_{IR} \text{ and } V_{DR} = 63 \text{ af/yr}$$

2. Volume Calculations for Other Uses: N/A

G. NARRATIVE/REMARKS/COMMENTS

This permit is for irrigation of pasture on 24 acres from groundwater at a diversion rate of .48 cfs. Water is diverted from groundwater by a well that was constructed in September 2014 (D0067343). The submersible pump extracts from a screened interval from 91 to 111 feet below land surface. The distribution system also serves Water Right Permit No. 65-23540, also owned by the applicant. The two permits do not overlap in place of use, but share a point of diversion.

In addition to the diversion system being in place, I confirmed beneficial use during the permitting period using imagery from the Sentinel satellite to calculate the NDVI (Normalized Difference Vegetation Index). NDVI is a proxy for photosynthesis and ranges from 0 to 1, with 1 indicating more plant activity. NDVI calculations were made using the remote sensing tools from Climate Engine (<http://climateengine.org>) to calculate the mean 2018 growing season difference in NDVI from the mean growing season NDVI from 2015 to 2017. The figures in the attachments to the report demonstrate a noticeable increase in the place of use NDVI during 2018 growing season. Heightened NDVI is also clear relative to neighboring non-irrigated rangeland.

From the diversion point, buried pipes carry the water to two pivots and several sprinklers that fill in the corners. Two measurements were made for this permit by running each pivot separately. We measured an average flow rate of 58.5 GPM

(.13 cfs) at the smaller southern pivot and 138 GPM (.30 cfs) at the larger pivot to the north.

The design of the system deems that both this permit and 65-23540 are watered by the same pivot when the northern pivot is running. A combined rate limit with right number 65-23540 will be used so that the applicant can maintain pressure in the system to irrigate 65-23540 and remain in compliance when the large pivot moves over that place of use. When the large pivot sweeps over the place of use for 65-23669, the diversion rate will be 0.30 cfs to reflect the capacity of the pump measured during the exam. The small pivot can then later be run at 0.13 cfs with the corner sprinklers..

The place of use was reduced to fit within the fence line of the parcel, bringing the total acreage down to 21 acres. Examination of the PLS maps suggests an addition of another section would be necessary in the legal description for the place of use; however, this water right is in an unsurveyed region as indicated by the dashed lines on the USGS quadrangle map. I am deferring to the legal descriptions of the tax lot for parcel RP16N03E202365, which is Tax lot N'LY PT TAX #37 IN SENE AND NESE S20 T16N R3E.

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>Beneficial Use</u>	<u>Period of Use</u>	<u>Rate of Diversion</u>	<u>Annual Volume</u>
IRRIGATION	04/15 to 10/31	0.30 CFS	63.0 AF
<u>Totals:</u>		0.30 CFS	63.0 AF

2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☒ None
☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☒ None

I. AUTHENTICATION Alex Moody - Hydrogeologist, Staff

Field Examiner's Name Alex Moody Date 9/18/2019
 Reviewer Daniel A. Moody Date 9-19-19



Figure 1: Mean difference of 2018 growing season NDVI from 2015 – 2017 mean growing season NDVI. Calculation based on Sentinel satellite imagery.

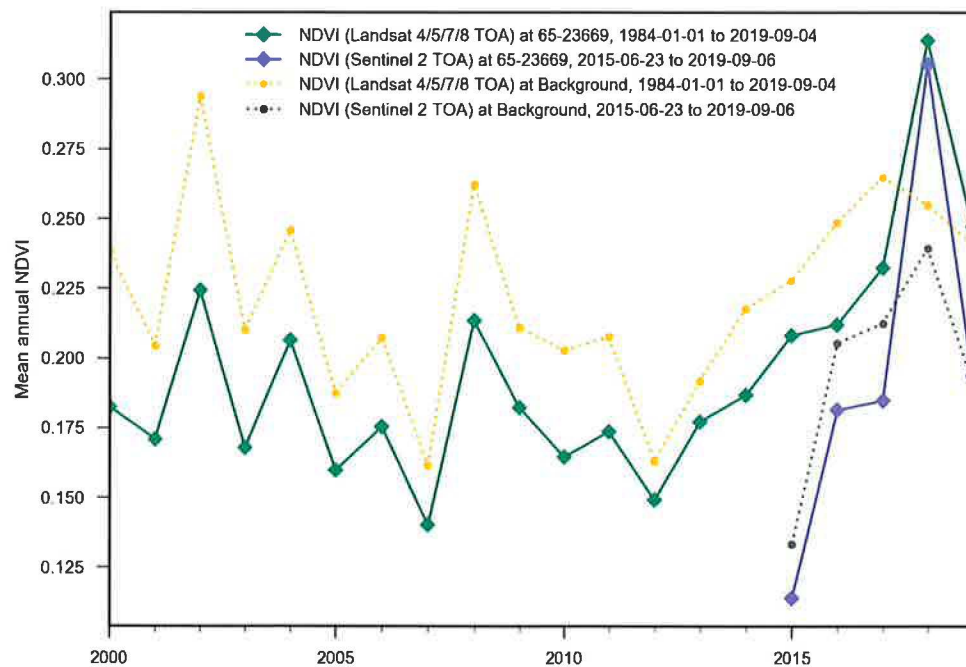


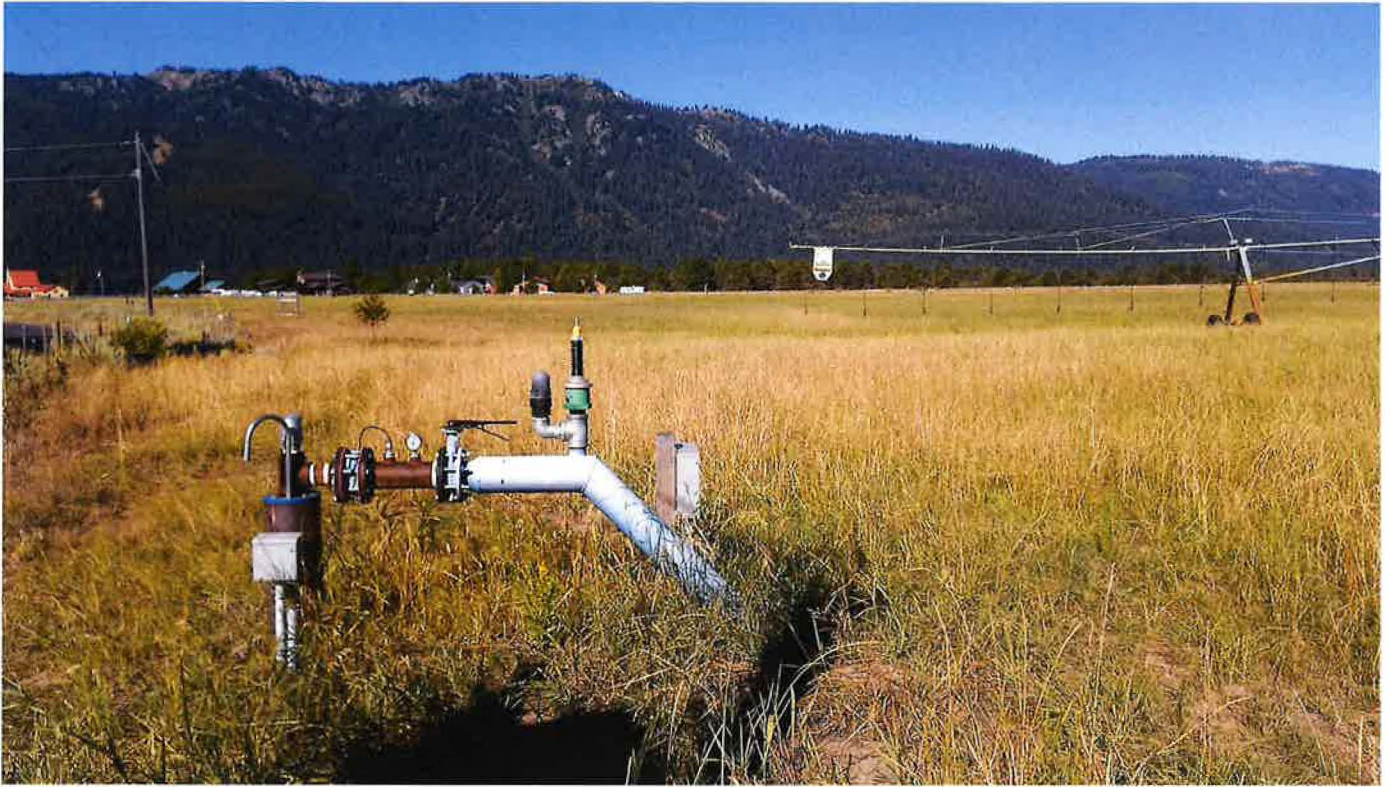
Figure 2: Mean annual NDVI for the place of use polygon (solid lines) and for the surrounding non-irrigated rangeland (dotted line). Both LANDSAT and Sentinel NDVI averages are shown. 2018 shows irrigation starting at the place of use. 2019 is low due to an incomplete record.



65-23669
System Diagram



0 0.02 0.04 0.06 0.08 Miles



Point of diversion (Metal Tag:D0067343). View is to the west.



End of large pivot.



Beginning of smaller pivot at southern end of place of use.



Remainder of smaller pivot at southern end of place of use.