

# Groundwater Application Review Summary Form

Application # G- 18486

GW Reviewer DENNIS DZLOWSKI

Date Review Completed: 8/10/2017

## 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).*



**PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS**

TO: Water Rights Section Date 08/10/2017  
 FROM: Groundwater Section Dennis Orłowski  
Reviewer's Name  
 SUBJECT: Application G- 18486 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: King Family Farms, Inc. County: Marion

A1. Applicant(s) seek(s) 0.20 cfs from one well(s) in the Willamette Basin,  
Pudding River subbasin

A2. Proposed use Irrigation (15.7 acres) Seasonality: March 1 – October 31

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	<b>Proposed</b>	<b>1</b>	<b>Alluvium</b>	<b>0.20</b>	<b>T7S/R1W-6 SW-NE</b>	<b>*1930' N, 1890'E from SW cor S36</b>

\* 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	200	TBD	TBD	TBD	150	0-50	+1-120		TBD	TBD	TBD	

Use data from application for proposed wells.

A4. **Comments:** \*Note: location description on application map appears to incorrectly reference the SE corner of Section 6; correlation with the provided tax lot information indicates it should instead reference the SW corner.

The proposed POA location is in the Howell Prairie region approximately 3.5 miles WSW of Silverton, Oregon.

Proposed well construction is based on knowledge of local hydrogeologic conditions and nearby wells completed in the alluvial aquifer system.

A5.  **Provisions of the Willamette** \_\_\_\_\_ 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 planned construction details for Proposed Well 1 indicate that it will obtain groundwater from a confined aquifer, so the pertinent basin rules (OAR 690-502-0240) do not apply.

A6.  **Well(s) #** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: \_\_\_\_\_

Comments: Not applicable.

**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) Medium water-use reporting, 7c (7-yrs. measurements);
  - 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 alluvial 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:** The proposed POA will obtain groundwater from water-bearing sand and gravel deposits (~60-70 feet thick) of the Willamette Aquifer system. These deposits are overlain by approximately 60-70 ft of low-permeability silts and clays (Willamette Silt) (Conlon and others, 2005; Gannett and Caldwell, 1998).

Within approximately one mile of the proposed POA location there are about 30 irrigation and nursery groundwater rights with wells completed in the alluvial aquifer, with several more exempt (domestic) wells also likely in the area. Reported yields in the permitted wells range up to several hundred gpm, but are more typically on the order of 50-250 gpm.

Groundwater level data for several alluvial aquifer wells in the area shows relative long-term stability, particularly since about 2010 (see attached hydrograph). Prior to 2010 groundwater levels were somewhat more variable. These trends possibly correspond to similar variations in annual precipitation amounts (see attached precipitation graph). Seasonal fluctuations in alluvial aquifer groundwater levels can be fairly high, on the order of 20-40 ft, so there is the potential for seasonal pumping interference.

These factors indicate that water for the proposed use is likely available within the capacity of the resource, but if a permit is granted the recommended permit conditions should be included to monitor and protect the resource and other groundwater rights in the area.



**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	Alluvium (Willamette Aquifer)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Basis for aquifer confinement evaluation:** Proposed Well 1 will tap water-bearing sand and gravel deposits of the Willamette Aquifer, which is confined by about 60-70 feet of low-permeability silts and clays (Willamette Silt). In the central Willamette Valley, Conlon and others (2005) report that fine-grained deposits (silt and clay) of 'more than 40 ft' thickness typically create confined conditions in the underlying water-bearing sand/gravel deposits. Furthermore, static groundwater levels in nearby wells are above the top of water-bearing units within the aquifer. These factors suggest that proposed Well 1 will obtain groundwater from a confined aquifer.

**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	Unnamed tributary to Pudding River 1	170-180	150-160	3100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Pudding River	170-180	160	3700	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	Howell Prairie Creek	170-180	170	8600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Basis for aquifer hydraulic connection evaluation:** The estimated groundwater elevations in the alluvial aquifer are coincident with or just above the elevations of SW1, SW2 and SW3. Furthermore, water table maps in the area indicate that groundwater in the alluvial aquifer system flows towards and discharges into local streams incised in the Willamette Silt (Conlon and others, 2003, 2005; Gannett and Caldwell, 1998). These facts indicate that the alluvial aquifer and local streams are hydraulically connected.

The depletion of local streams by proposed Well 1 will be attenuated, but not eliminated, by the low vertical hydraulic conductivity (permeability) of the Willamette Silt and other clays and silts that lie between the deeper sands and gravels and the stream beds. Net impacts will be small at the onset of pumping, but will increase with time until a new equilibrium between local recharge and discharge is reached. At that time depletion is expected to be relatively constant throughout the year.

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

SW1 and SW2: Pudding River > Molalla River – above Howell Prairie (WID 152)

SW3: Pudding River > Molalla River – above Mill Creek (WID 151)

**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	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	22.70	<input type="checkbox"/>	<<25%	<input type="checkbox"/>
1	2	<input type="checkbox"/>	<input type="checkbox"/>	MF152A	10.00	<input checked="" type="checkbox"/>	22.70	<input type="checkbox"/>	<<25%	<input checked="" type="checkbox"/>



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?
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

**Comments:** C3a: PSI was assumed for SW2 (Pudding River/WID 152) because the proposed Qw (0.20 cfs) exceeds 1% of the lowest ISWR flow in SW2 (0.10 cfs).

The Hunt 2003 analytical stream depletion model was used to estimate pumping interference at 30 days at SW1 (unnamed tributary to Pudding River). Model results indicate that interference is expected to be much less than 25% of the maximum allocated pumping rate at 30 days. The model was not applied to SW2 because it is within the same WAB and is several hundred feet farther away, and thus the estimated stream depletion would be even less than that estimated for SW1.

C3b: not applicable.

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													
(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:** Not applicable.

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:** From C3a, PSI was assumed for SW2 (Pudding River/WID 152) because the proposed Qw (0.20 cfs) exceeds 1% of the lowest monthly ISWR flow in SW2 (0.10 cfs). Thus, if the requested allocation were reduced to less than 0.10 cfs, then PSI would not be found on this basis.

**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.**

\_\_\_\_\_

**References Used:** Application file: G-184862.

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, B.J., Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

Conlon, T.D., Lee, K.K., and Risley, J.R., 2003, Heat tracing in streams in the central Willamette Basin, Oregon, in Stonestrom, D.A. and Constantz, Jim, eds., Heat as a tool for studying the movement of groundwater near streams: U.S. Geological Survey Circular 1260, chapter 5, p. 29-34.

Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.

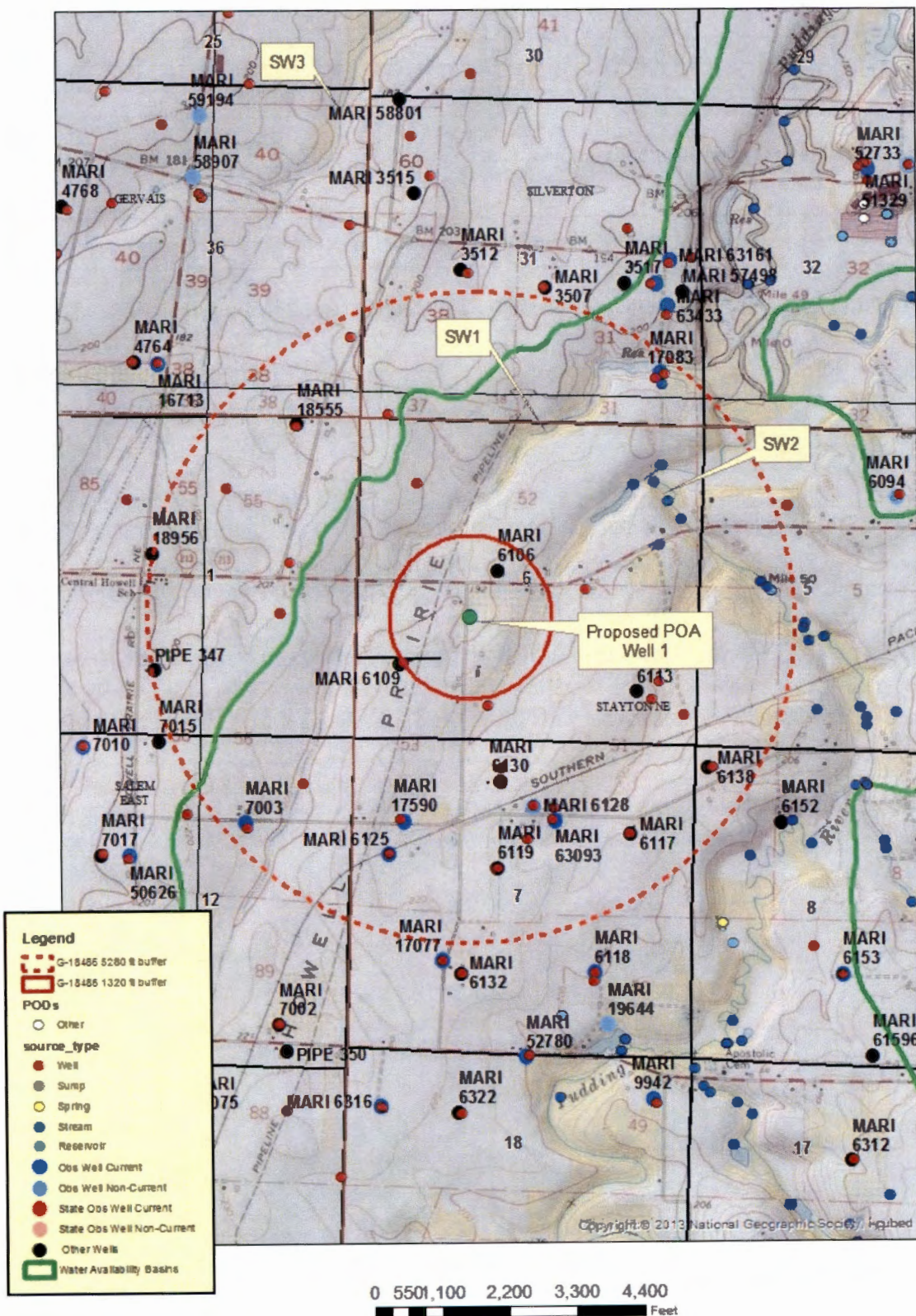
Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

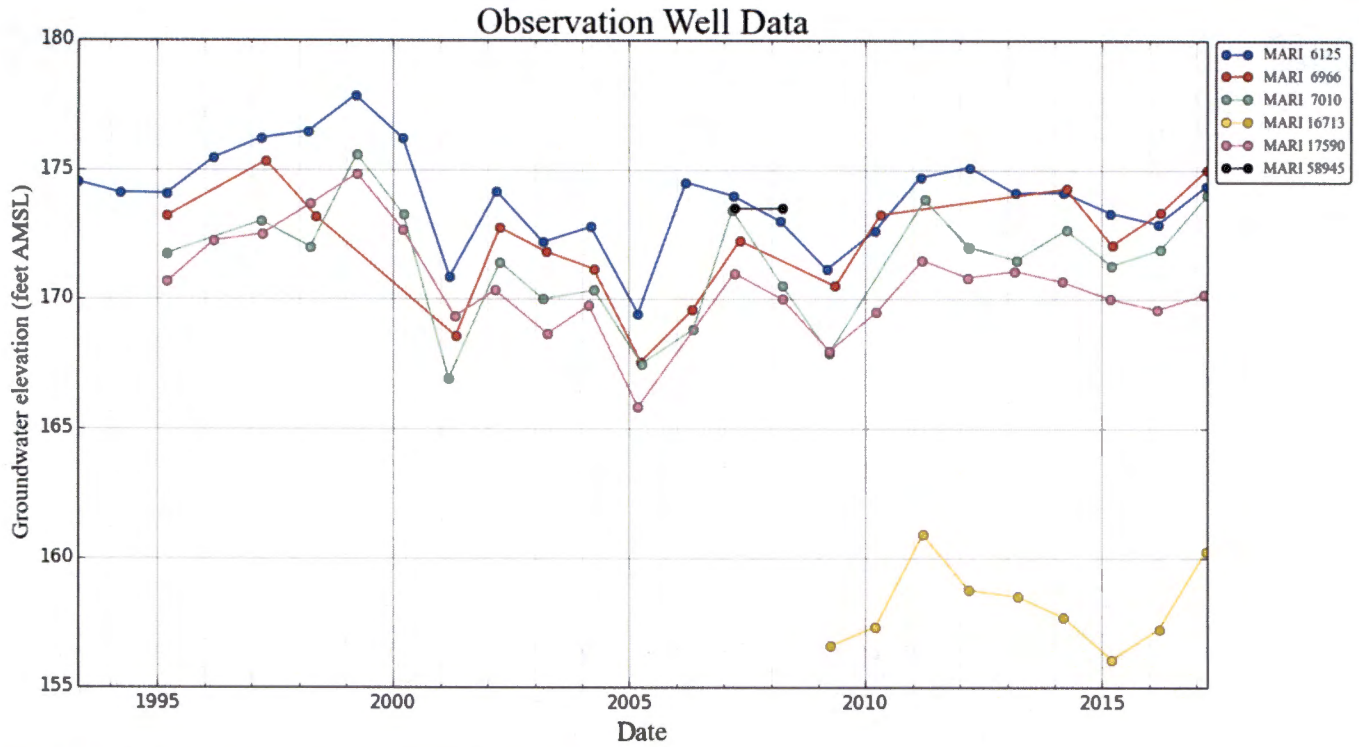


Well Location Map

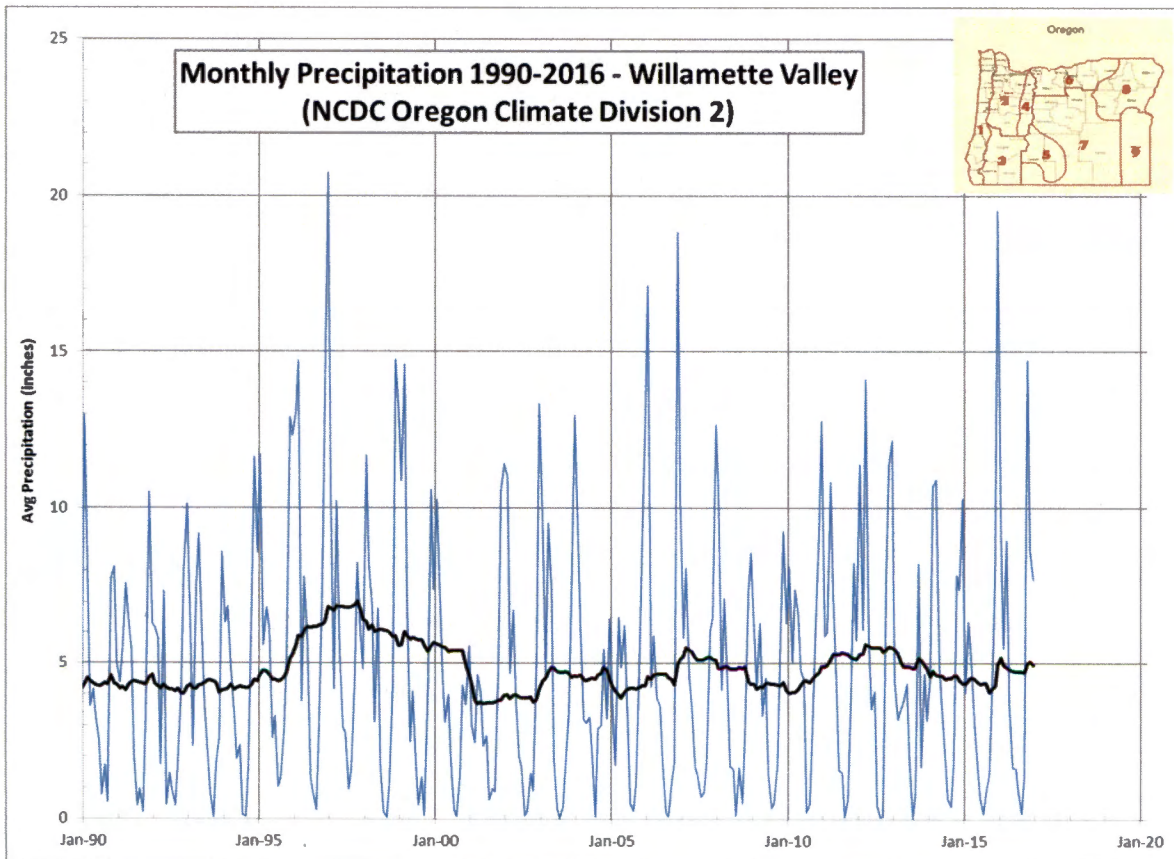
# Application G-18486 King Family Farms T7S, R1W Section 6



Water-Level Trends in Nearby Wells (SWL only)



Long-Term Monthly Precipitation Record, Willamette Valley





Water Availability Tables

Oregon Water Resources Department  
Water Availability Analysis

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## Water Availability Analysis Detailed Reports

PUDDING R > MOLALLA R - AB HOWELL PRAIRIE  
WILLAMETTE BASIN

Water Availability as of 8/9/2017

Watershed ID #: 152 [\(Map\)](#) Exceedance Level: 80%   
Date 8/9/2017 Time: 3:38 PM

- Water Availability Calculation
- Consumptive Uses and Storages
- Instream Flow Requirements
- Reservations
- Water Rights
- Watershed Characteristics

### Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second  
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	603.00	69.80	533.00	0.00	10.00	523.00
FEB	649.00	60.90	588.00	0.00	10.00	578.00
MAR	587.00	40.00	547.00	0.00	10.00	537.00
APR	451.00	21.40	430.00	0.00	10.00	420.00
MAY	235.00	14.30	221.00	0.00	10.00	211.00
JUN	111.00	29.30	81.70	0.00	10.00	71.70
JUL	43.80	44.80	-1.17	0.00	10.00	-11.20
AUG	24.70	37.20	-12.50	0.00	10.00	-22.50
SEP	22.70	22.30	0.42	0.00	10.00	-9.58
OCT	38.90	4.35	34.60	0.00	10.00	24.50
NOV	233.00	18.80	214.00	0.00	10.00	204.00
DEC	608.00	63.80	544.00	0.00	10.00	534.00
ANN	385,000.00	25,700.00	360,000.00	0.00	7,340.00	353,000.00

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Water Availability Analysis

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## Water Availability Analysis Detailed Reports

PUDDING R > MOLALLA R - AB MILL CR  
WILLAMETTE BASIN

Water Availability as of 8/9/2017

Watershed ID #: 151 [\(Map\)](#) Exceedance Level: 80%   
Date 8/9/2017 Time: 3:40 PM

- Water Availability Calculation
- Consumptive Uses and Storages
- Instream Flow Requirements
- Reservations
- Water Rights
- Watershed Characteristics

### Water Availability Calculation

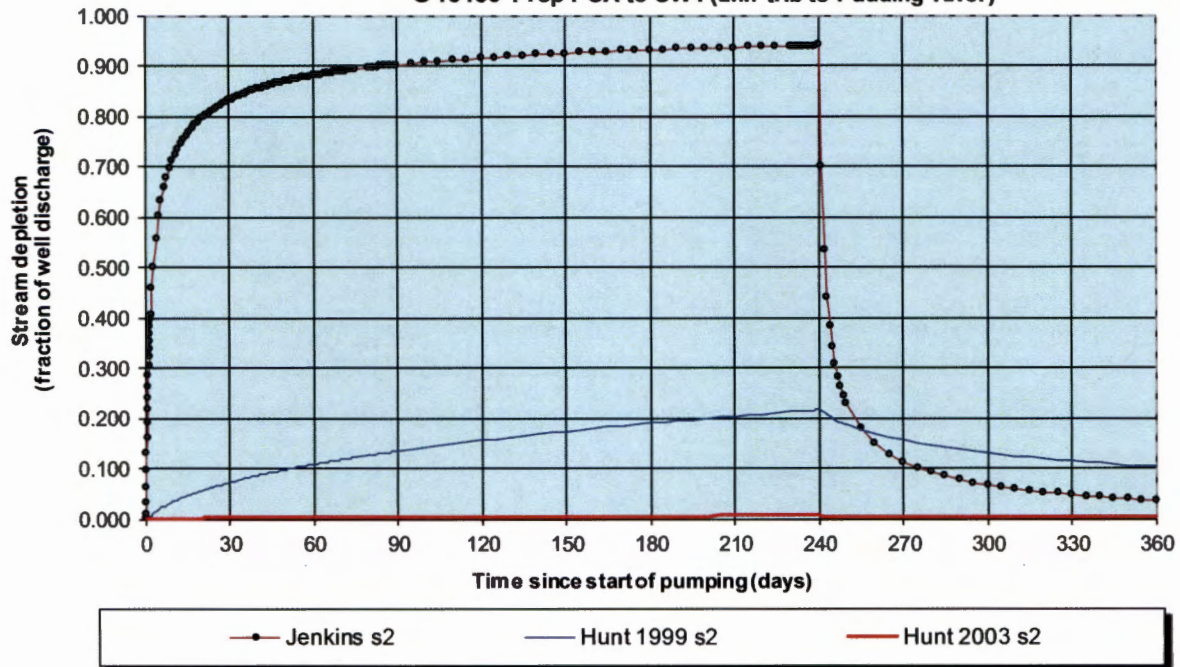
Monthly Streamflow in Cubic Feet per Second  
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	1,040.00	124.00	916.00	0.00	36.00	880.00
FEB	1,190.00	114.00	1,076.00	0.00	36.00	1,030.00
MAR	1,010.00	75.70	934.00	0.00	36.00	898.00
APR	707.00	51.50	736.00	0.00	36.00	699.00
MAY	425.00	46.90	378.00	0.00	36.00	340.00
JUN	224.00	69.90	154.00	0.00	36.00	118.00
JUL	105.00	116.00	-9.97	0.00	36.00	-37.00
AUG	71.00	90.20	-19.20	0.00	36.00	-65.20
SEP	67.30	51.40	15.90	0.00	36.00	-20.10
OCT	91.60	11.00	80.60	0.00	36.00	44.60
NOV	363.00	48.30	315.00	0.00	36.00	279.00
DEC	957.00	118.00	839.00	0.00	36.00	803.00
ANN	706,000.00	55,100.00	651,000.00	0.00	26,100.00	627,000.00

Hunt 2003 Stream Depletion Model Results

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

G-18486 Prop POA to SW1 (unn trib to Pudding River)



Output for Stream Depletion, Scenario 2 (s2):						Time pump on (pumping duration) = 240 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	83.1%	88.0%	90.2%	91.5%	92.4%	93.0%	93.6%	94.0%	11.3%	6.6%	4.7%	3.6%
H SD 1999	7.2%	10.8%	13.4%	15.5%	17.3%	18.9%	20.3%	21.6%	15.5%	13.0%	11.4%	10.2%
H SD 2003	0.21%	0.27%	0.33%	0.39%	0.45%	0.52%	0.58%	0.64%	0.50%	0.50%	0.50%	0.50%
Qw, cfs	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
H SD 99, cfs	0.014	0.022	0.027	0.031	0.035	0.038	0.041	0.043	0.031	0.026	0.023	0.020
H SD 03, cfs	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.20	0.20	0.20	cfs
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	a	3100	3100	3100	ft
Well depth	d	150	150	150	ft
Aquifer hydraulic conductivity	K	5	50	500	ft/day
Aquifer saturated thickness	b	70	70	70	ft
Aquifer transmissivity	T	350	3500	35000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.1	0.1	0.1	ft/day
Aquitard saturated thickness	ba	60	60	60	ft
Aquitard thickness below stream	babs	40	40	40	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	25	25	25	ft
Streambed conductance (lambda)	sbc	0.062500	0.062500	0.062500	ft/day
Stream depletion factor	sdf	27.457143	2.745714	0.274571	days
Streambed factor	sbf	0.553571	0.055357	0.005536	
input #1 for Hunt's Q_4 function	t'	0.036420	0.364204	3.642040	
input #2 for Hunt's Q_4 function	K'	45.761905	4.576190	0.457619	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	0.553571	0.055357	0.005536	