Hanna Bros. Ranch
[redacted]

19 March 2022

State Water Resources Control Board
1001 I St.
Sacramento, CA 95814

Re: 2022 Cooperative Solution – Hanna Bros. Ranch

To the State Water Board:

Hanna Bros. Ranch provides this letter to further describe its proposed local cooperative solution for the 2022 irrigation season.

Approximately 1200 acres are currently being irrigated on property owned by Hanna Bros. Ranch.

Skip and Tony Hanna, two brothers who came to Scott Valley in 1944, started Hanna Bros. Ranch. It currently is owned and operated by three of Skip's sons – Greg, Grant, and Judd – and one of Tony's daughters, Julie. Gabe, Skip's oldest grandson, is also a full time employee on the ranch. Hanna Bros. irrigates approximately 1000 acres of alfalfa, grain, or grass hay, and approximately 200 more of pasture grass for summer cattle feed. The irrigation infrastructure consists of 12 wells, 4 pivots, 30 wheel lines, hand lines, and guns/cannons.

Most irrigation sets for wheel lines or hand lines run for 11 hours and are moved twice a day. The pivot systems, which are more efficient, can usually cover a field with 1.5" of water in 2-3 days.

Many of our irrigation systems don't perfectly match the shape of the fields (e.g. a circular pivot in a rectangular field), and thus creates the need for different types of irrigation to provide complete coverage. Those corners or ends are often a challenge when managing irrigation systems as they generally run for fewer sets or overlap over existing systems. Some areas, especially in the case of fields with pivots are considered for fallowing.

Irrigation season in Scott Valley generally stars early to mid-April. For a three-cutting alfalfa season, irrigation typically ends in August. Grass fields, either for grazing or hay, require more water and get irrigated into September. A fourth-cutting alfalfa crop will get irrigated into early September.

Conservation Efforts taken place since 2020:

*Most of these upgrades have been done without any financial assistance

1) Our newest pivot will have a Low Energy Precision Application (LEPA) package. This will increase irrigation efficiency up to 25%.
2) Pivot systems have replaced wheel lines (some with LEPA, others with rotator heads).
3) Wheel line nozzles have been, or will be, replaced to reduce size.
4) Wheel line set times have been shortened.
5) Soil moisture sensors have been installed and will continue to be installed, primarily in fields with pivot systems.
6) Guns/cannon nozzles have been reduced in size.
7) Forbearance of edges: Some pivot field edges are irrigated with wheel lines or hand lines. Some have been eliminated or used only prior to first cutting.
8) Reduced cutting: Some fields will only be cut twice, and most likely none will be cut four times.
9) Pivot flow rates reduced – in addition to installing LEPA, not as much water is needed due to its efficiency, we can reduce the amount of pressure needed to run the system.
10) For 2022, we are reducing the acreage of alfalfa planted. Originally we planned on planting 140 acres, and are only planting 90 in 2022. The remaining 50 will stay in grain (which uses significantly less water) another year.

With the exception of some small reimbursements from Pacific Power, all of the above upgrades have been financially borne by Hanna Bros. Ranch.

Hanna Bros. Ranch realizes that these water reductions can only be a temporary solution. They are not a sustainable way to support a ranch, its owners, and its employees. Aside from one full-time, year-round employee, we also employ 2-3 seasonal employees for the summer. Further sacrifices will force the ranch unable to continue. We support and value a plan of action that can ease the struggles of this water crisis, especially one that does not prevent our families from living here.

This plan is offered in good faith regarding the local control solution for the 2022 irrigation season. All rights, claims, and defenses with regard to the matters described herein are hereby expressly reserved. Moreover, Hanna Bros. Ranch offers this plan voluntarily. We are open and willing to negotiate and be available for the betterment of Scott Valley.

Regarding a cooperating agency, we are open to options. We would be comfortable working with Preston Harris of the RCD. Preston is a neighbor who has done projects on our property in the past and is familiar with our land. We understand whoever is our partnering person will need to have access to the ranch to look at

irrigating practices, we must point out that we will need to be involved with knowing about their arrival. We are open to suggestions, but for now, we will be tracking our water usage "analog," or on written calendars. If there is a more efficient or easier way that RCD prefers, we can adjust.

Also, Hanna Bros. has existing water rights from both the Scott River and the "Big Slough" for the fields we call "Tobias," "Patton Lane," and "Reynolds." We will not use this water right to replace conserved groundwater.

To the extent surface water is made available under our contract the SVID, the surface water will not be used to increase volume of water used in the 2022 irrigation season over the volume of water used in the baseline 2020 irrigation season, nor decrease the estimated overall 36% reduction in groundwater use approved as part of this local cooperative solution.

The 20 acre parcel titled "Moffett" on the spreadsheet is not part of Hanna Bros. Ranch, but is owned by J. Judd Hanna (one of the owners of Hanna Bros.) and Regina Hanna. Also, the nozzle size recorded on the spreadsheet is, mostly, 13/64". This is an average taken on a best guess. Most wheel lines have a variety of inconsistent nozzle sizes, ranging from 3/16" to the larger, un-numbered rubber gasket style nozzles, to sprinkler heads with double nozzles. As a best guess, I averaged the nozzle sizes to 13/64". In the future, as nozzles and sprinkler heads get replaced, we will reduce that size to 3/16".

Our contact information is provided above. Please feel free to contact us by phone or email, or text at [redacted] regarding any questions you might have in moving forward with this plan.

Thank you,

Greg Hanna, Grant Hanna, Judd Hanna, and Julie Pynes
Owners, Hanna Bros. Ranch

BINDING AGREEMENT

SISKIYOU RESOURCE CONSERVATION DISTRICT
P.O. Box 268, Etna, CA 96027
PHONE (530) 467-3975 FAX (530) 467-5617
Email: sisqrcd@sisqtel.net
Website: www.siskiyourcd.com

Binding Agreement

Contractor Contact Information:

Business:	Siskiyou RCD
Contact Person:	Chris Voigt
Address:	P.O. Box 268/450 Main St. Etna, CA 96027
Phone:	530-467-3975
Email:	Chris@siskiyourcd.com

Landowner Contact Information:

Business:	Hanna Bros. Ranch
Contact Person:	Judd Hanna
Address:	[redacted]
Phone:	
Email:	

Background

Under the 2021 drought emergency regulation instated by the State Water Resources Control Board (SWRCB) that established drought emergency minimum flows in the Scott River, a Local Cooperative Solution (LCS) may be proposed by individuals or groups to submit by petition to the Deputy Director of the SWRCB as an alternative means of reducing water use to meet or preserve drought emergency minimum flows and provide fishery benefits, in lieu of curtailment. This binding agreement between the (Landowner) and Siskiyou Resource Conservation District (SRCD) will monitor the SRWCB approved LCS to achieve 1) a net reduction of water use of 30 percent throughout the irrigation season; and 2) a monthly reduction of at least 30 percent in the July through October 31 period, as compared to 2020.

SISKIYOU RESOURCE CONSERVATION DISTRICT
P.O. Box 268, Etna, CA 96027
PHONE (530) 467-3975 FAX (530) 467-5617
Email: sisqrcd@sisqtel.net
Website: www.siskiyourcd.com

Recitals

1. Section 875(f)(4)(D) of the drought emergency regulation provides a specific type of LCS that was determined to be sufficient for approval by the Deputy Director;
2. For overlying or adjudicated groundwater diversions for irrigated agriculture described in sections 875.5(f)(4)(D)(i)-(iii) [Scott River], the Deputy Director may approve a groundwater-basin-wide, groundwater sub-basin-wide, or any number of individual local cooperative solutions totaling at least 400 acres where:

    i. The proposal is based on a binding agreement. "Such binding agreement may be made with a coordinating entity with the expertise and ability to evaluate and require performance of the agreement, for example with the California Department of Fish and Wildlife (CDFW), the National Marine Fisheries Service, the Scott Valley and Shasta Valley Watermaster District, a non-profit organization with expertise and experience in water-saving transactions or similarly qualified entity."

    ii. For the Scott River: "The proposal provides at least: 1) a net reduction in water use of 30 percent throughout the irrigation season (April 1-October 31), as compared to the prior irrigation season; and 2) a monthly reduction of at least 30% in the July 1 through October 31 period, as compared to the prior year or 2020. Such reduction may be demonstrated by evidence that provides a reasonable assurance that the change in farming practice or other action results in at least the relevant proportionate reduction. Such evidence may include but is not limited to: pumping reports; actions that will be taken to reduce water use; estimation of water saved from conservation measures or changes in irrigation or planting decisions; and electric bills."

Proposed Local Cooperative Solution: (*Specific action plan to be completed by landowner, see attached LCS application form)*

SISKIYOU RESOURCE CONSERVATION DISTRICT
P.O. Box 268, Etna, CA 96027
PHONE (530) 467-3975 FAX (530) 467-5617
Email: sisqrcd@sisqtel.net
Website: www.siskiyourcd.com

Binding Agreement Terms

The Landowner is required to adhere to the LCS, as approved by SWRCB. The Landowner has requested that SRCD serve as the coordinating entity. As such, both parties agree to the following:

- For the duration of this binding agreement where SRCD is the coordinating entity, the Landowner shall give SRCD the right to reasonably access the included parcels for the limited propose of verifying execution of the LCS. Any individual not directly employed or contracted by SRCD shall provide pre-notification to, and shall obtain approval by the Landowner before accessing the property,

- SRCD will strive to notify the Landowner a day in advance of visiting the parcels and shall provide the Landowner or designee the ability to participate in monitoring activities,

- It is anticipated that SRCD representatives will visit the property approximately twice per month to monitor the approved LCS, unless inadequacies are discovered, in which case additional field visits will occur until inadequacies are rectified. A monitoring inspection may include verification of any or all of the actions described in the conservation plan and may include inspection checklist/notes/reports and photo verification,

- SRCD will submit the information regarding the verification materials and actions described in this agreement, and conservation plan incorporated by reference, to the State Water Board upon request, for the purposes of verifying compliance with the LCS,

- This binding agreement is not intended to preclude, harm, or otherwise interfere with the landowner's ability to secure any funding to mitigate the financial impacts imposed by the emergency regulation or proposed conservation practices. SRCD supports the use of funding programs to ameliorate the costs of implementing the conservation practices described in the proposed conservation plan: planning and cooperation under a voluntary LCS should not undermine the ability to receive such funding,

- This binding agreement may be terminated by either party at any time. Both parties agree to take reasonable measures to resolve any concerns related to the performance of the LCS, negative interpersonal interaction, or any unforeseen circumstance prior to invoking termination,

- As the irrigation season unfolds, there may be reason to change the terms of the LCS or this binding agreement with respect to its implementation and verification. Any such changes to the LCS or service agreement will need to be agreed upon by the Landowner

SISKIYOU RESOURCE CONSERVATION DISTRICT
P.O. Box 268, Etna, CA 96027
PHONE (530) 467-3975 FAX (530) 467-5617
Email: sisqrcd@sisqtel.net
Website: www.siskiyourcd.com

and SRWCB. If a Landowner requests SRCD assistance with an updated LCS, the SRCD and Landowner will enter into a new Binding Agreement.

Payment
In consideration for the services to be performed by SRCD, the Landowner agrees to pay SRCD at the rate of $75.00 per hour for initial consultation and $75.00 per hour for all services rendered after signing of the binding agreement.

Expenses
The Landowner will reimburse SRCD for expenses that are attributable directly to work performed under this Agreement. Any expenses incurred will be approved by the Landowner beforehand. SRCD will submit an itemized statement of Contractor's expenses attached with invoicing.

Terms of Payment
Upon completion of SRCD services under this binding agreement, the SRCD will submit an invoice. The Landowner will pay SRCD the compensation described within 30 days of receiving SRCD's invoice.

Term of Agreement
This agreement will become effective when signed by both parties and will terminate on:

- November 1, 2022, or
- The date a party terminates the binding agreement.
- Monitoring information will be collected by the SRCD and shared with State Water Board as a field report in accordance with their reporting schedule or upon request
- SRCD is not authorized to and will not distribute data or other information regarding work done under this contract to any third party without previous written approval by the Landowner
- Landowner agrees that water saved under the LCS will not be transferred to parcels not included under the LCS, and Landowner will not knowingly or intentionally otherwise take actions outside of the LCS that diminish, in any material way, the overall thirty percent reduction establish by the actions described ion the LSC

SISKIYOU RESOURCE CONSERVATION DISTRICT

P.O. Box 268, Etna, CA 96027

PHONE (530) 467-3975 FAX (530) 467-5617

Email: sisqrcd@sisqtel.net

Website: www.siskiyourcd.com

Signatures

SRCD Representative

4/6/2022

Date

Landowner

6 April 2022

Date

SUPPORTING INFORMATION

Client: Hanna Botohers LLC

Aerial Airport Rd

Office: Yreka
County: Siskiyou
Agency: USDA-NRCS
NRCS Planner: Heather Wood
Date: 5/3/2021
Siskiyou RCD

USGS Quad: Fort Jones
Landuse: Cropland & Pastureland
Farm 1931 Tract

Approx Scale 1:15,600
when printed on 8-1/2 x 11 paper

gend

clu_a_ca093

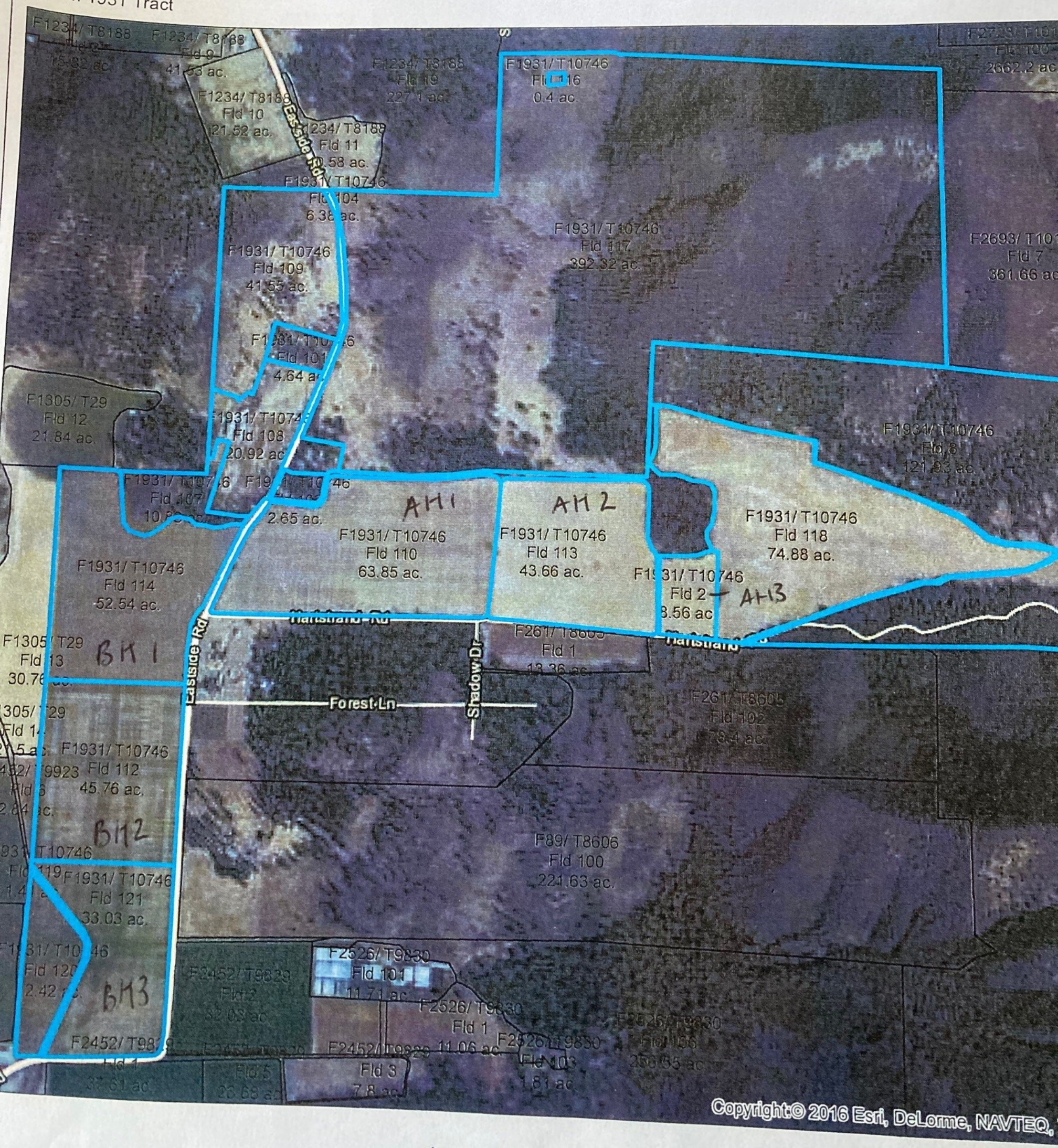
0 2,000

Client: Hanna Brothers LLC

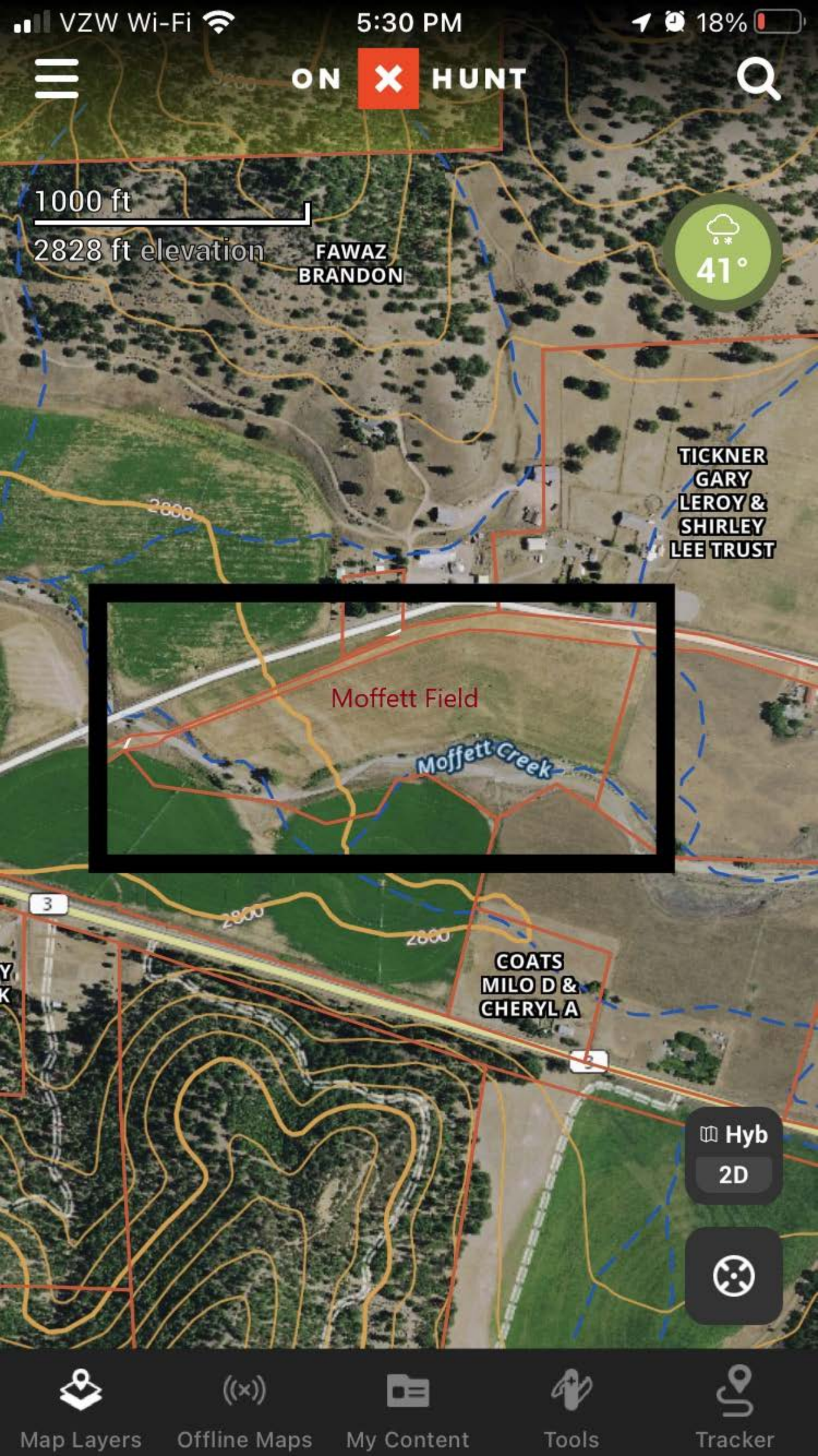
Hartstrand Property Aerial

Office: Yreka
County: Siskiyou
Agency: USDA-NRCS
NRCS Planner: Heather W
Date: 5/3/2021
Siskiyou RCD

USGS Quad: McConaughy Gulch
Landuse: Cropland,Pastureland, & Range
Farm 1931 Tract



Approx Scale 1:15,600
when printed on 8-1/2 x 11 paper


VZW Wi-Fi
5:30 PM
18%
ON X HUNT
1000 ft
2828 ft elevation
FAWAZ
BRANDON
41°
TICKNER
GARY
LEROY &
SHIRLEY
LEE TRUST
Moffett Field
Moffett Creek
2800
2800
2800
3
COATS
MILO D &
CHERYL A
Hyb
2D
Map Layers
Offline Maps
My Content
Tools
Tracker

Field ID	2020 Irrigated Acres	2020 Irrigation Method	2020 Crop Type	Calculation Factors	April 2020 Acre Feet Applied	May 2020 Acre Feet Applied	June 2020 Acre Feet Applied	July 2020 Acre Feet Applied	August 2020 Acre Feet Applied	September 2020 Acre Feet Applied	Ocotber 2020 Acre Feet Applied	2020 Total Acre Feet	2022 Irrigated Acres	2022 Irrigation Method	2022 Crop Type	Calculation Factors	April 2022 Acre Feet Applied	May 2022 Acre Feet Applied	June 2022 Acre Feet Applied	July 2022 Acre Feet Applied	August 2022 Acre Feet Applied	September 2022 Acre Feet Applied	Ocotber 2022 Acre Feet Applied	2022 Acre Feet	Soil Moisture Sensor Installed
TB1	61.1	Wheel Line	Alfalfa	100 sprinklers, mix of 13/64", 60 psi, 7 days per pass (average), 11 hour sets. (1 line has 14 moves, 32 heads = 8.4 acre ft, 1 line has 18 moves, 32 heads = 10.7 acre ft, one line	24.5	73.5	73.5	48.9	24.5	0	0	244.9	61.1	Wheel Line	Grain	100 sprinklers, 13/64", 60 psi, 7 days per pass, 10 hour sets. 20.4 acre feet applied for 1x coverage.	40.8	40.8	20.5	0	0	0	0	102.1	
TB2	40	Wheel Line	Alfalfa	108 sprinklers, 13/64", plus one gun with a .4" nozzle, 60 psi, 5 days per pass, 11 hour sets (1 line has 10 moves, 38 heads = 7.1 acre ft, 1 line has 10 moves, 37 heads = 6.9 acre ft, 1	37.7	56.55	56.55	37.7	18.9	0	0	207.4	40	Wheel Line	Alfalfa	108 sprinklers, 13/64", 60 psi, 1 gun with .4" nozzle, 5 days per pass, 10 hour sets. 17 acre ft per 1x over. 3 cuttings	17	34	34	34	0	0	0	119	
T2BA	140	Pivot with rotators	Alfalfa and Grass	1.5" application passes were performed. 17.5 acre ft of coverage per full circle. About 4 days per pass. (70 = 4 passes)	70	70	70	70	35	0	0	315	140	Pivot with rotators	Alfalfa and Grass	1.3" application. 15.16 acre ft per pass.	30.3	45.5	45.5	45.5	30.4	15.4	0	212.6	Yes
Macs	154.5	Pivot with rotators	Orchard Grass	Usually 1.5" application passes were performed. 19.3 acre ft applied per full circle. Approx. 4 days per pass. Pasture grass for cattle, 4 passes per month.	77.3	77.3	77.3	77.3	77.3	38.7	0	425.2	154.5	Pivot with rotators	Grass	1.3" application. 16.7 acre ft. per pass.	33.4	50.2	66.8	50.2	33.4	33.4	0	267.4	Yes
PL	56	Wheel Line	Alfalfa	60 sprinklers, 13/64", 60 psi, 8 days per pass, 11 hour sets. 17.8 acre feet per 1x over.	35.6	35.6	35.6	35.6	17.8	17.8	0	178	56	Wheel Line	Alfalfa and Grain	60 sprinklers, 13/64", 60psi, 8 days per pass, 10 hour sets. 16.2 acre ft. per pass. 3 cuttings.	16.2	35.5	35.5	16.2	16.2	0	0	119.6	
MGT	71	Wheel Line	Alfalfa	90 sprinklers, 13/64", 60 psi, 1 gun with .86" nozzle, 8 days per pass, 11 hour sets. 24.8 acre ft per pass. 3 cuttings.	24.8	49.6	49.6	49.6	24.8	24.8	0	223.2	71	Wheel Line	Alfalfa	90 sprinklers, 13/64", 60 psi, 8 days per pass, gun with .77" nozzle, 10 hour sets. 22.3 acre feet. 3 cuttings	22.3	44.6	44.6	22.3	22.3	0	0	156.1	
40	38.3	Wheel Line	Alfalfa	42 sprinklers, 13/64", 60 psi, 9 days per pass, 11 hour sets. 13.7 acre ft applied per pass.3 cuttings. 3x over per cutting	13.7	27.4	27.4	27.4	13.7	13.7	0	123.3	37.3	Wheel Line	Alfalfa	42 sprinklers, 13/64", 60 psi, 9 days per pass, 10 hour sets. 12.4 acre ft per pass. 3 cuttings. 2x over per cutting	12.4	24.8	24.8	12.4	0	0	0	74.4	
TY1	14	Wheel Line	Grain	35 sprinklers, 13/64", 60 psi, 4 days per pass, 11 hour sets. Wheel line on corner of pivot. Approx 14 acres. 5.2 acre ft. per pass	5.2	10.4	15.6	5.2	0	0	0	36.4	14	Wheel Line	Alfalfa	35 sprinklers, 13/64", 60 psi, 4 days per pass, 10 hour sets. 4.7 acre ft. per pass	4.7	9.4	9.4	4.7	4.7	0	0	32.9	
TY1A	65.5	Pivot with rotators	Grain	Usually 1.5" application passes were performed. 65.5 acres, 8.2 acre ft. per 1/2 circle.	8.2	24.6	24.6	0	0	0	0	57.4	65.5	Pivot with rotators	Alfalfa	1.3" application. 7.1 acre ft. per 1/2 circle	7.1	14.2	21.3	21.3	7.1	0	0	71	Yes
TY2	30	Wheel Line	Grass	51 sprinklers, 13/64", 60 psi, 4 days per pass, 11 hour sets. 7.6 acre ft. applied per 1x over. Approx. 20 + acres. Pivot corner.	7.6	15.2	15.2	15.2	7.6	7.6	0	68.4	30	Wheel Line	Alfalfa - new	51 sprinklers, 13/64", 60 psi, 4 days per pass, 10 hour sets. 6.9 acre ft. applied per 1x over. 3 cuttings.	6.9	13.8	13.8	6.9	6.9	0	0	48.3	
TY2A	63.2	Pivot with rotators	Grass	Usually 1.5" application passes were performed. 63.3 acres covered. 7.9 acre ft. per 1/2 circle.	15.8	23.7	23.7	23.7	15.8	15.8	0	118.5	63.2	Pivot with rotators	Alfalfa - new	1.3" application. 6.9 acre ft. per 1/2 circle	6.9	13.7	13.7	13.7	13.7	13.7	0	75.4	
R5	23.3	Wheel Line	Grain	48 sprinklers, 13/64", 60 psi, 4 days per pass, 11 hour sets. 7.2 acre ft. per pass.	14.4	14.4	7.2	0	0	0	0	36	23.3	Wheel Line	Grain	48 sprinklers, 13/64", 60 psi, 4 days per pass, 10 hour sets. 6.5 acre ft. per pass.	13	13	6.5	0	0	0	0	32.5	
R4	37.7	Wheel Line	Alfalfa	35 sprinklers, 13/64", 60 psi, 9 days per pass, 11 hour sets. R1-R4 average 11.7 acre ft. per pass. 3 cuttings.	11.7	23.4	23.4	23.4	11.7	11.7	0	105.3	37.7	Wheel Line	Alfalfa	35 sprinklers, 13/64", 60 psi, 9 days per pass, 10 hour sets. R1- R4 ave. 10.7 acre ft. per pass	10.7	21.3	21.3	10.7	10.7	0	0	74.7	
R3	37.7	Wheel Line	Alfalfa and Grass	35 sprinklers, 13/64", 60 psi, 9 days per pass, 11 hour sets	23.4	23.4	23.4	23.4	11.7	11.7	0	117	37.7	Wheel Line	Alfalfa and Grass	35 sprinklers, 13/64", 60 psi, 9 days per pass, 10 hour sets	21.3	21.3	21.3	10.7	10.7	0	0	85.3	
R2	37.7	Wheel Line	Alfalfa	35 sprinklers, 13/64", 60 psi, 9 days per pass, 11 hour sets	11.7	23.4	23.4	23.4	11.7	11.7	0	105.3	37.7	Wheel Line	Alfalfa	35 sprinklers, 13/64", 60 psi, 9 days per pass, 10 hour sets	10.7	21.3	21.3	10.7	10.7	0	0	74.7	
R1	37.7	Wheel Line	Alfalfa	35 sprinklers, 13/64", 60 psi, 9 days per pass, 11 hour sets	11.7	23.4	23.4	23.4	11.7	11.7	0	105.3	37.7	Wheel Line	Alfalfa	35 sprinklers, 13/64", 60 psi, 9 days per pass, 10 hour sets	10.7	21.3	21.3	10.7	10.7	0	0	74.7	
AH1	63.8	Wheel Line	Alfalfa	66 sprinklers, 13/64", 60 psi, 10 days per pass, 11 hour sets. 24.5 acre feet per pass. 3 cuttings	24.5	49	49	49	24.5	0	0	196	63.8	Wheel Line with new smaller nozzles	Alfalfa	66 sprinklers, 3/16", 60 psi, 10 days per pass, 10 hour sets. 19.2 acre ft per pass. 3 cuttings	19.2	38.4	36.5	19.2	19.2	0	0	132.5	
AH2	43.7	Wheel Line	Alfalfa and Grain	34 sprinklers, 13/64", 60 psi, 14 days per pass, 11 hour sets. 17.7 acre ft. per pass. 3 cuttings	17.7	35.5	35.5	35.5	17.7	0	0	141.9	37	Pivot with LEPA	Grain	1.3" application. 4 acre ft. per pass	8	12	8	0	0	0	0	28	Yes
AH3	8.6	Wheel Line	Alfalfa and Grain	18 sprinklers, 13/64", 60 psi, 5 days per pass, 11 hour sets. 3.4 acre ft. per pass. 3 cuttings	3.4	6.8	6.8	6.8	3.4	0	0	27.2	8.6	Wheel Line with new smaller nozzles	Grain	18 sprinklers, 3/16", 60 psi, 5 days per pass, 10 hour sets. 2.6 acre ft. per pass.	2.6	5.2	5.2	0	0	0	0	13	
BH1	52.5	Wheel Line	Alfalfa	86 sprinklers, 13/64", 60 psi, 9 days per pass, 11 hour sets. 2 wheel lines. 15.2 acre ft. per pass. 3 cuttings	15.2	30.4	30.4	30.4	30.4	0	0	136.8	52.5	Wheel Line with new smaller nozzles	Alfalfa	86 sprinklers, 3/16", 60 psi, 9 days per pass, 10 hour sets. 11.8 acre ft. per pass.	11.8	23.6	23.6	11.8	11.8	0	0	82.6	
BH2	45.8	Wheel Line	Grass	66 sprinklers, 13/64", 60 psi, 6 days per pass, 11 hour sets. 14.8 acre ft. per pass. 3 cuttings	29.6	29.6	29.6	29.6	14.8	0	0	133.2	45.8	Wheel Line with new smaller nozzles. 1 with smaller, I haven't changed over to smaller yet.	Grass	66 sprinklers, 3/16", 13/64" 60 psi, 7 days per pass, 10 hour sets. 12.4 acre ft per pass.	12.4	24.8	24.8	24.8	12.4	0	0	99.2	
BH3	45	Wheel Line	Alfalfa	66 sprinklers, 13/64", 60 psi, 6 days per pass, 11 hour sets. 14.8 acre ft. per pass. 3 cuttings	14.8	29.6	29.6	29.6	14.8	0	0	118.4	45	Wheel Line	Grain	66 sprinklers, 13/64", 60 psi, 7 days per pass, 10 hour sets. 13.5 acre ft. per pass.	13.5	27	27	0	0	0	0	67.5	
Moffett	20	Wheel Line	Alfalfa and Grass	43 sprinklers, 13/64", 60 psi, 4 days per pass, 11 hour sets. 6.4 acre ft. per pass	6.4	12.8	12.8	12.8	12.8	0	0	57.6	20	Wheel Line with new smaller nozzles	Alfalfa and Grass	43 sprinklers, 3/16, 60 psi, 4 days per pass, 10 hour sets. 5 acre ft. per pass.	5	10	10	10	5	0	0	40	
TOTALS:	1187.1				504.9	765.55	763.55	677.9	400.6	165.2	0	**3277.7**	1179.4				336.9	565.7	556.7	335.8	225.9	62.5	0	**2083.5**	
																Percent Reduction	33%	26%	27%	**50%**	**44%**	**62%**		**36.43%**	

Notes

A 13/64" nozzle puts out 9.24 gpm, a 3/16 nozzle puts out 7.88 gpm (cited from Irrigation in the Pacific Northwest, from the WA, ID, and OR ag extension offices).
Days per pass just means how many days it takes 1 wheel line to cover a field (e.g. if a field has 6 riser and 1 wheel line, 6 risers = 18 moves, 2 moves per day = 9 days per pass. Sets in a pass depend on the size of the field. The average is 7-9 days (which is 14-18 sets because we change 2x day), but some fields only have 10 sets (or 5 days).
(usually) Sets per pass = days per pass*2