

Wagner & Bonsignore

Consulting Civil Engineers, A Corporation

James C. Hanson
Consulting Civil Engineer
A Corporation

Nicholas F. Bonsignore, P.E.
Robert C. Wagner, P.E.
Paula J. Whealen
Henry S. Matsunaga

David H. Peterson, CEG, CHG
David P. Lounsbury, P.E.
David Houston, P.E.
Vincent Maples, P.E.
Patrick W. Ervin, P.E.
Ryan E. Stolfus

January 19, 2017

Mr. Les Grober, Deputy Director
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

Re: *Battle Creek Meadows Ranch, Inc., Tehama County*
Alternative Compliance Plan for Measuring and Reporting Water Diversions


Dear Mr. Grober:

We are hereby submitting an Alternative Compliance Plan for Measuring and Reporting Water Diversions for the referenced Statements of Water Diversion and Use held by Battle Creek Meadows Ranch, Inc. in Tehama County. Section 935 of the adopted text of Drought Emergency Regulation for Measuring and Reporting Water Diversions (Regulations), the attached Alternative Compliance Plan is intended to fulfill the requirements of the Regulations. Owners of Battle Creek Meadows Ranch, Inc. (Ranch) are submitting an Alternative Compliance Plan (Plan) because strict compliance with sections 933 or 934 of the Regulations would be unreasonable expensive.

We appreciate your review and approval of this Plan. Please contact me if you have any questions regarding this matter.

Very truly yours,

WAGNER & BONSIGNORE
CONSULTING CIVIL ENGINEERS


Paula J. Whealen, Principal

Encl.

cc: Bruce Starkweather, Battle Creek Meadows Ranch, Inc.

2151 River Plaza Drive • Suite 100 • Sacramento, CA 95833-4133
Ph: 916-441-6850 or 916-448-2821 • Fax: 916-779-3120

Nicholas F. Bonsignore, P.E.
Robert C. Wagner, P.E.
Paula J. Whealen
Henry S. Matsunaga

David H. Peterson, CEG, CHG
David P. Lounsbury, P.E.
David Houston, P.E.
Vincent Maples, P.E.
Patrick W. Ervin, P.E.
Ryan E. Stolfus

**ALTERNATIVE COMPLIANCE PLAN
BATTLE CREEK MEADOWS RANCH, INC.
STATEMENTS OF WATER DIVERSION AND USE¹**

Section 1. Required Information

A. Name and contact information for all diverters covered by the Plan.

Battle Creek Meadows Ranch, Inc.
c/o Bruce R. Starkweather, President
1040 45th Street
Sacramento, CA 95819
(916) 849-2309

B. Name and contact information for the person designated to represent all diverters covered by the Plan in matters before the board.

Wagner & Bonsignore Consulting Civil Engineers, A Corporation
2151 River Plaza Drive, Suite 100
Sacramento, CA 95833
(916) 441-6850

C. Identification of each individual water right type and priority covered by the Plan.

This Plan covers twenty separate Riparian/Pre-1914 claims associated with the following Statements of Water Diversion and Use identified in **Table 1**:

**Table 1
Points of Diversion Covered by Alternative Compliance Plan**

Point of Diversion	Statement	Diversion Name	Water Source
1	S012313	Upper Martin Creek Dam	Martin Creek
2	S012314	Timothy Field	Culvert @ Hwy 172

¹ Statements S012313, S012314, S012315, S012316, S012317, S012318, S012319, S012320, S012321, S012322, S012323, S012324, S021597, S022600, S022601, S022602, S022604, S022605, S022606, S022609, S022610, S022611 and S022612 ("subject Statements").

3	S012315	Lower Martin Creek Dam	Martin Creek
4	S012316	Upper Battle Creek	Battle Creek
5	S021597	Station Springs	Seasonal Spring
6	S012318	Sheep Camp Springs	Seasonal Spring
7	S012319	Copper Mine Field South	Seasonal Stream
8	S012320	Glines Camp Springs	Seasonal Spring
9	S012321	Tod Ford Gate	Seasonal Spring
10	S012322	Lower Bear Wallow	Bear Wallow Creek
11	S012323	Seasonal Stream	Seasonal Stream
12	S022600	Lower Supan Meadow	Seasonal Stream
13	S022601	Red Cabin Springs	Seasonal Spring
14	S022602	Lower Battle Creek	Battle Creek
15	S022604	Copper Mine Field North	Seasonal Spring
16	S022605	Tod Ford Springs	Seasonal Spring
17	S022606	Upper Bear Wallow	Bear Wallow Creek
18	S022609	Bob's Cabin Spring	Seasonal Spring
19	S022610	Spring House Spring	Seasonal Spring
20	S022611	Supan Springs	Seasonal Spring

D. Detailed description of the area served by the plan, including all points of diversion whether used or not used, all methods of diversion, any conveyance systems, all beneficial uses of water, and all acreage served.

As shown on the attached maps (**Figures 1 and 2**), about 850 acres of pasture are irrigated from water diverted at the 20 points of diversion listed under Item C. Lands are served by water from perennial flows in Battle Creek, Bear Wallow Creek, Martin Creek, and seasonal flows from ephemeral streams and springs. The entire place of use is located in meadowlands at the base of steeper forested slopes. Points of diversion are generally located where surface water runoff can be conveyed to pasture lands within the same watershed, and then allowed to flood irrigate by gravity. Any excess surface flows not consumed by pasture evapotranspiration is returned to the system either by draining to the South Fork Battle Creek system or naturally percolating to underlying groundwater.

Each point of diversion is located where surface water runoff would naturally collect, with the exception of water taken under control at Points 2, 3, 4, 6, 16, and 18. As shown on **Figures 1 and 2**, these points are located where water is directed into irrigation ditches to serve adjacent pastures. Flow in irrigation ditches can commingle with water diverted from other sources.

Battle Creek Meadows Ranch has a Lake or Streambed Alteration Agreement (LSAA) with California Fish and Wildlife (CDFW) to annually install a gravel diversion berm at Point 4 in the late spring and remove in the fall. Additionally, CDFW has assisted in the installation and maintenance of a fish screen and bypass outlet at this location.

Pasture fields are served by points of diversion as identified on **Figures 1 and 2**, and summarized in **Table 2** below:

Table 2
Fields and Acreage Served by Points of Diversion

Field Name	Acres Served	Source Point of Diversion
Back Field	52.1	4 and 10
	99.2	4 and 11
	21.3	4 and 12
Back Meadow	51.9	4 and 9
	57.2	4 and 16
Bob's Cabin	16.3	18
Copper Mine Field	25.7	4 and 15
	9.2	4
Gline's Camp Field	11.0	8
Horse Pastures	13.4	3
House Field	8.9	3
Ice House Field	29.7	3
Martin Creek Field	27.1	3
Mill Field	16.3	17
Mrs. Adams Field	4.6	5
North Flume Field	10.6	4 and 7
North Lower Meadow	86.0	3
Red Cabin Field	3.0	1
	3.0	13
Sheep Camp	16.5	6
	4.5	6
South Flume Field	30.8	4
South Lower Meadow	58.3	4 and 12
Spring Bogg	2.9	7
Spring House	16.6	19
Supan Meadow	3.7	20
Timothy Field	80.9	2
	35.3	1
Upper Meadow	33.5	5
	7.7	14

E. Assessor's parcel numbers and ownership of all parcels by Battle Creek Meadows Ranch, Inc within the area covered by the plan.

Assessor's parcel numbers are shown in **Table 3** below:

Table 3
Assessor's Parcel Numbers Covered by Alternative Compliance Plan

013-280-12	013-290-26	015-070-36	015-090-31
013-280-22	013-290-40	015-070-37	015-090-32
013-280-43	013-290-44	015-070-38	015-090-33
013-280-44	013-340-01	015-070-39	015-090-34
013-280-45	013-340-02	015-090-03	015-090-35
013-280-46	013-340-04	015-090-06	015-090-36
013-280-47	013-340-05	015-090-23	015-090-37
013-280-48	013-340-06	015-090-27	015-090-38
013-280-56	013-460-06	015-090-28	015-090-39
013-280-58	015-070-34	015-090-29	015-090-40
013-290-24	015-070-35	015-090-30	

F. Identification of the proposed measurement frequency.

Direct measurements of surface water are not proposed by this Plan. Beginning and ending dates associated with seasonal diversions from perennial streams such as Battle Creek, Martin Creek, and Bear Wallow Creek will be logged. Beginning and ending dates for the occurrence of flow from ephemeral streams and springs will also be logged.

G. Identification of the proposed measurement methodology.

This Plan intends to estimate net irrigation water diversion by calculating the demand of Ranch pasture lands based on site-specific and time-specific information. Irrigation demand of pasture grown on the Ranch is proposed to be calculated based on factors including climate, soil properties, crop development, and irrigation practices. Crop water demand will be determined by estimating crop evapotranspiration (ET_c). ET_c is the combination of soil surface evaporation and crop transpiration. Evaporation and transpiration occur simultaneously when irrigating, and will change during the development of the crop. During initial development, more water is consumed by evaporation, while in later stages, transpiration consumes more water. ET_c is satisfied primarily by a combination of effective rainfall, effective seepage, and water applied through irrigation

practices. Water applied and consumed through Ranch irrigation practices is evapotranspiration of applied water or ET_{AW} .

ET_C is a function of climatological conditions, crop characteristics, and soil conditions. The following information will be compiled:

- Daily climatological data reported by California Irrigation Management Information System (CIMIS). Conditions include: solar radiation, maximum and minimum temperature, wind speed, dew point temperature, and precipitation. Daily measurements from the nearby McArthur CIMIS station have been available since from October 31, 1983.
- Individual crop characteristics such as maximum rooting depth and allowable depletion as reported in Irrigation and Drainage Paper No. 56 by the Food and Agricultural Organization (FAO) of the United Nations (Allen, R.K., L.S. Pereira, D. Raes, and M. Smith, 1998).
- General soil properties for the area, such as depth and available water holding capacity, as reported on the Web Soil Survey program of the United State Department of Agriculture (USDA) Natural Resources Conservation Service.

These data will be used as input to the CUP+ program developed by California Department of Water Resources (DWR) and University of California at Davis. The CUP+ program was written to provide a tool for estimating net irrigation water diversion. CUP+ will use the aforementioned daily raw weather data from CIMIS to compute daily reference evapotranspiration (ET_O) solving the daily Penman-Montieth equation, as recommended by the American Society of Civil Engineers (ASCE) and FAO as a standard method for estimating ET_O . Crop and soil information, input from aforementioned sources, will be used to estimate daily crop coefficient factors (K_C), ET_C , effective rainfall, effective seepage, and changes in soil water content to determine ET_{AW} .

Irrigation demand will be estimated using ET_{AW} values and applying an irrigation efficiency factor estimated based on methods of water application. Efficiency factors will be estimated using "Irrigation Efficiency" by T. Howell, USDA, 2003. An efficiency factor of 85% will be assumed for irrigation of pasture, based on a potential range of 80-95% as indicated in the study. The calculated irrigation demand will be assumed to be beneficially used by the crop when the amount is equal to, or less than, the amount of water available at each point of diversion.

The amount of potential water available at each point of diversion will be estimated based on a proration of streamflows measured at the nearby USGS Gage No. 11381500 Mill Creek Near Los Molinos, CA. The location of the Mill Creek gage and is shown on the attached **Figure 3**. This gage was selected as a reference gage because of its proximity to the watersheds of interest, its long period of record, and its location within a stream that is neither flow regulated nor highly impaired by storage or large diversion upstream from the gaging station.

Average seasonal flows at points of diversion were estimated by adjusting the Mill Creek gaged flow data for differences in drainage area and mean annual precipitation, using the following formula:

$$Q_2 = Q_1 \times (A_2/A_1) \times (MAP_2/MAP_1) \quad \text{Eqn. 1}$$

Where:

Q_2 = Flow at POI;

Q_1 = Estimated unimpaired flow at gage;

A_2 = Watershed area above POI;

A_1 = Watershed area above gage;

MAP_2 = Weighted mean annual precipitation for watershed above POI;

MAP_1 = Weighted mean annual precipitation for watershed above gage.

Mill Creek and Point of Diversion watershed areas and mean annual precipitation isohyets are shown on **Figure 3**. Watershed boundaries were delineated on electronic versions of USGS quad maps, and watershed areas were determined using AutoCAD. Isohyets were obtained from the map entitled “Mean Annual Precipitation in the California Region,” Compiled by S.E. Rantz, dated 1972. A summary of drainage areas and weighted mean annual precipitation for each watershed is shown below in **Table 4**.

Table 4
Drainage Areas and Weighted Mean Annual Precipitation

Watershed	Area	M.A.P	% of Gage
USGS 113811500 Mill Creek	83,066.4	45.7	-
P.O.D. 1	4,215.4	59.7	6.62%
P.O.D. 3	4,352.9	59.3	6.80%
P.O.D. 4	6,405.5	65.6	11.07%
P.O.D. 5	191.3	51.3	0.26%
P.O.D. 6	267.6	54.9	0.39%
P.O.D. 7	615.0	54.1	0.88%
P.O.D. 9	96.7	50.2	0.13%
P.O.D. 10	1,097.1	49.6	1.43%
P.O.D. 11	348.3	48.5	0.44%
P.O.D. 12	251.9	47.1	0.31%
P.O.D. 14	6,472.4	65.5	11.16%
P.O.D. 15	13.9	51.4	0.02%
P.O.D. 16	219.4	50.3	0.29%
P.O.D. 17	1,088.8	49.6	1.42%
P.O.D. 18	315.4	48.5	0.40%
P.O.D. 19	7.6	48.5	0.01%
P.O.D. 20	32.3	47.3	0.04%

Net irrigation water diversion from each point of diversion will be estimated as the minimum of the amount of water calculated as irrigation demand and the amount of water calculated as available between the beginning and ending dates logged as described in Item F.

- H. Topographic map(s) or aerial photograph(s) of the area covered by the plan that show the separate places of use authorized to be served by claimed water rights covered by the plan and showing the acreage served.

A topographic map and aerial photograph based map of the area covered by the plan are attached as **Figures 1 and 2.**

- I. An implementation schedule, including date-specific, objective milestones of plan implementation from date of filing through final implementation, including the estimated milestones for acquiring permits required for plan implementation and the estimated milestones for compliance with the California Environmental Quality Act, if required.

The methodology proposed in this Plan has been utilized for the reporting of beneficial use pursuant to each claim of right since the 2012 reporting cycle. The acquisition of additional permitting or compliance with the California Environmental Quality Act in relation to operations of the Ranch will not be required.

- J. Budget for implementation of the plan and the source(s) of financing for the plan.

Financing for the plan will be available from Ranch agricultural earnings. As described in the budget and cost documentation in Section 3, the Ranch operates on net taxable income ranging from -\$30,000 to +\$24,000 annually from its agriculture production. Existing Ranch staff will log pertinent dates for the beginning and ending dates of available flow at each diversion point. An engineering firm, or similarly qualified professional, will prepare the analysis of beneficial use as described in Item G. The annual analysis and reporting under the Alternative Compliance Plan can be done for approximately \$5,000.

- K. List of any permits required for plan implementation, the agencies that will issue the permits, and expected dates for issuance.

As described in Item D, Battle Creek Meadows Ranch has an LSAA with CDFW at the Battle Creek diversion at POD 4.

- L. Affirmation, signed by all diverters covered by the plan, that the plan will be implemented in accordance with the schedule contained herein and that all claimed water rights covered by the plan will not be exercised outside the scope of the plan.

See attached Affirmation from Claimant.

Section 2. Explanation of Alternative Compliance

As strict compliance with the requirements sections 933 and 934 of the Regulations are not feasible for the Ranch, alternative compliance will be achieved per the method described in Item G. The methodology proposed is the most feasible method to estimate the net irrigation water diversion.

The proposed methodology estimates the amount of surface water removed from the system by calculating net irrigation water diversions by the Ranch in accordance with recommended methods. The program proposed to be utilized, described in Item G, was developed by the State of California for this purpose. As described in Item G, the Penman-Montieth equation, used by the program, is recommended by ASCE and FAO as a standard method for estimating ETo. All daily raw weather data will be compiled from published public sources provided by the State on its CIMIS website. Estimates of water availability will similarly be based on prorated published public data from USGS, using the methodology approved by the State Water Resources Control Board's Policy for Maintaining Instream Flows in Northern California Coastal Streams.

Section 3. Unreasonable Expense of Strict Compliance with Regulations Sections 933 and 934

The Ranch has procured cost estimates from a consulting hydrographer for the installation and maintenance of measuring devices that would satisfy strict compliance with Regulations Sections 933 and 934. The cost of equipment, installation, and one year of monitoring by the consulting hydrographer would be about \$75,405. This amount exceeds the annual earnings of agricultural production for the Ranch. Subsequent years of maintaining the measuring equipment and recording data was estimated to be about \$22,000 annually.

Section 4. Certification of Alternative Compliance

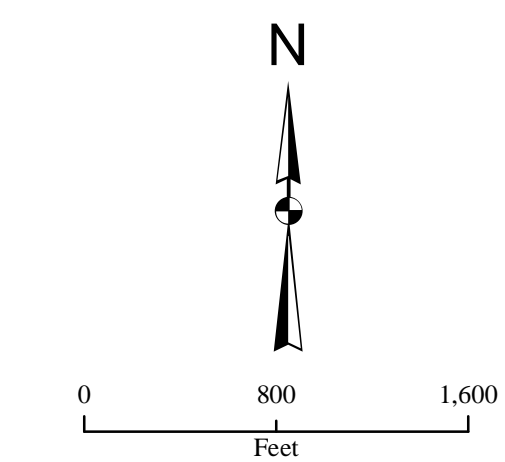
I hereby certify that the plan described herein will be implemented on January 1, 2017 for the purpose of determining the monthly amount of surface water directly diverted under the subject claims of right; and that all claimed water rights covered by the plan will not be exercised outside the scope of the plan.

Battle Creek Meadows Ranch, Inc.

A handwritten signature in black ink, appearing to read 'BRS', is written over a horizontal line.

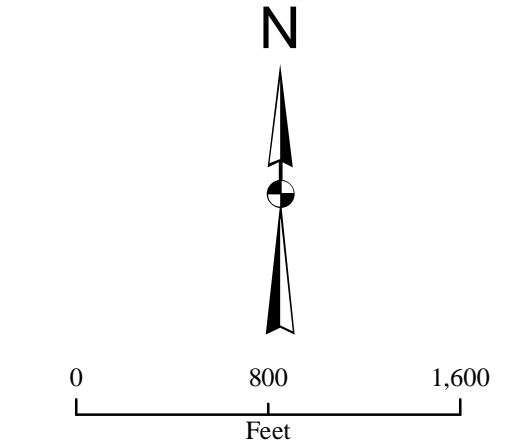
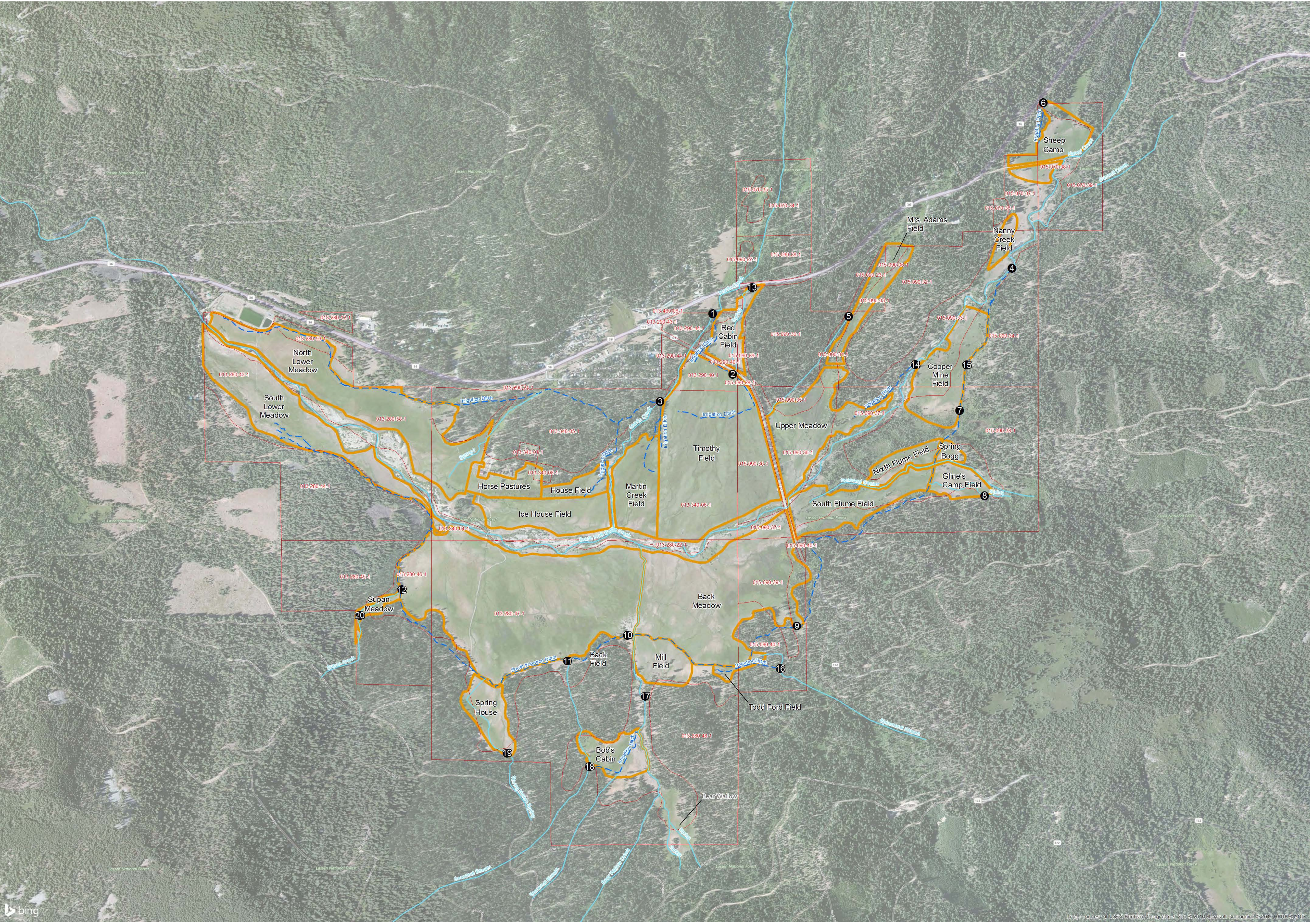
Bruce R. Starkweather, President

Date: JAN 18, 2017



- Point of Diversion
- Stream
- - Irrigation Ditch/Pipeline
- ▭ Parcels (Tehema County, May 2010)
- ▭ Place of Use

Wagner & Bonsignore
Consulting Civil Engineers, A Corporation



- Legend**
- Point of Diversion
 - Stream
 - Irrigation Ditch/Pipeline
 - Parcels (Tehema County, May 2010)
 - Place of Use

Figure 2
Battle Creek Meadows Ranch
Tehama County, California
Wagner & Bonsignore
Consulting Civil Engineers, A Corporation

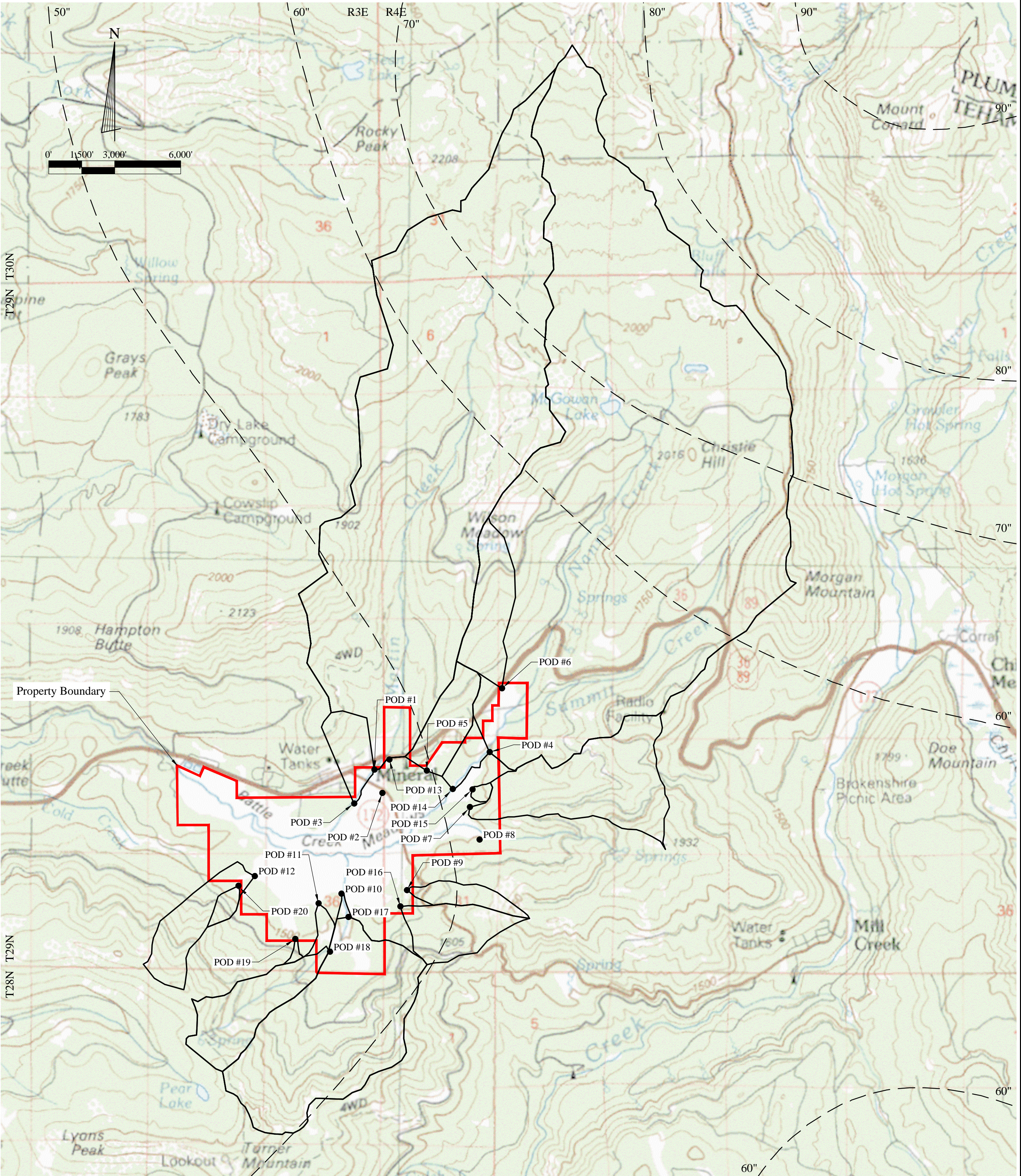
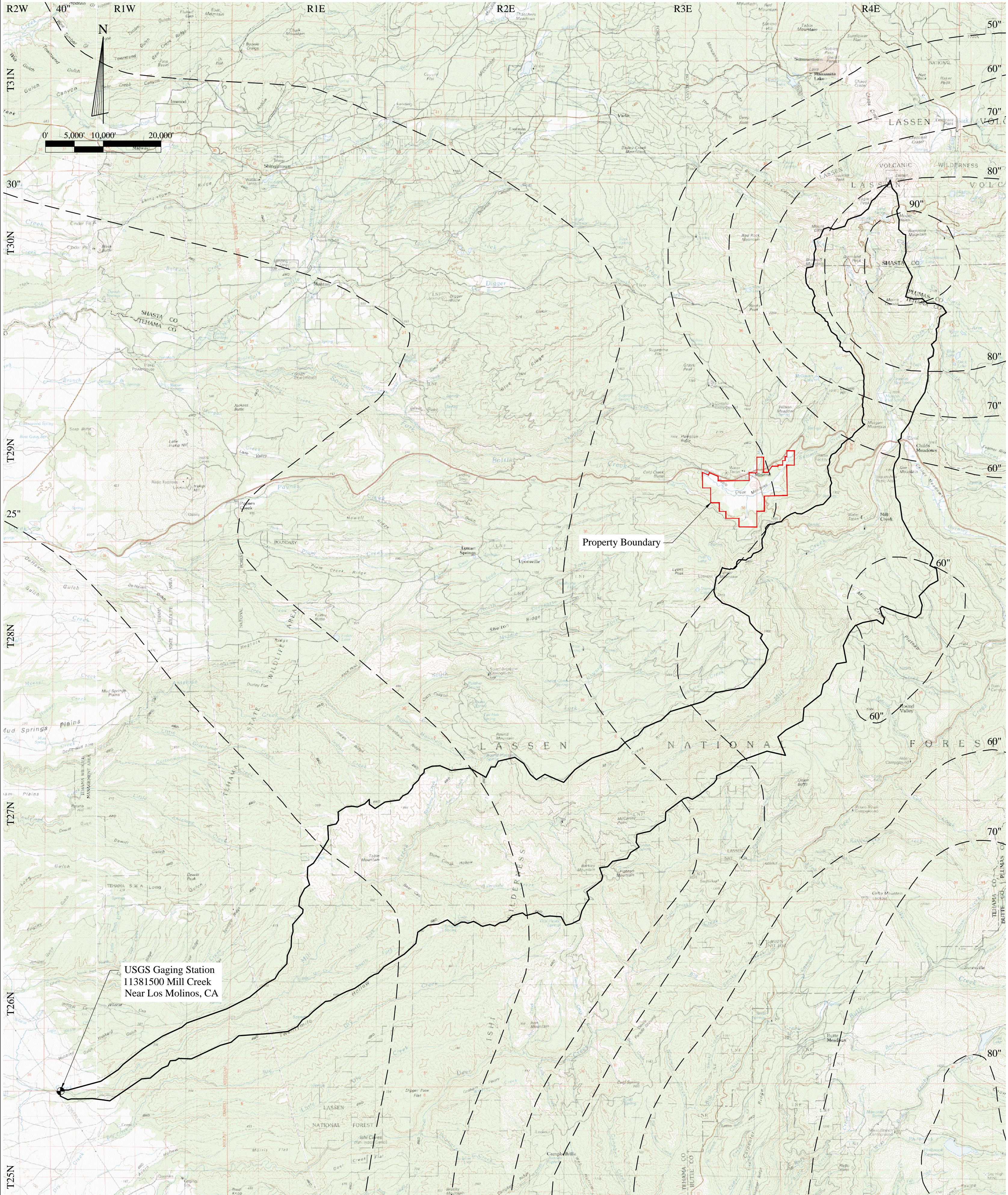


FIGURE 3
Battle Creek Meadows Ranch

Map Showing
Watersheds of Interest
with
Lines of Equal Mean
Annual Precipitation

Tehama County, California

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

November 2016

LEGEND

- Watershed Boundary
- 40" Mean Annual Precipitation Isohyetal
- Property Boundary
- Point of Diversion
- U.S.G.S. Gaging Station

Base map per USGS 30x60 Minute Quad maps for Burney, Lake Almanor and Red Bluff.
Portion of Mean Annual Precipitation in the California Region, by S.E. Rantz, Jr. 1972.

Q:\Drawings\Battle Creek Meadows Ranch\CAD\Watersheds and Precipitation.dwg