

Bella Vista Water District

Explanation of Methodology for Residential Agriculture Variance Application

On January 14, 1965, construction began on the Bella Vista Water District, also known as the Cow Creek Unit of the Central Valley Water Project, by the U.S. Bureau of Reclamation. The project included the installation of large transmission mains and a high-capacity pump station to deliver water under a service contract for 24,578 acre-feet annually, serving 34,388 acres.

The Bella Vista Water District was established to provide irrigation, municipal, industrial, and domestic water to local farms and residents. Initially, most of the water was intended for pasture irrigation and small-scale farming during the dry summer months, as well as to support future urban and suburban development.

Over time, residential agriculture has become a significant part of water usage within the District. Many properties that were once used for commercial farming have transitioned to residential agriculture within rural and residential settings. In response, the District created a separate customer classification for those using their land for non-commercial agricultural purposes.

These “Rural” customer accounts meet the same basic requirements as agricultural accounts: a minimum water meter size of 1 inch and at least 2 irrigable acres.

Initial Review of DWR’s LAM Data

Upon initial review of the DWR-provided data for the Land Area Estimates (LAM) Project, the GIS components were examined using ArcGIS Pro. The focus of our analysis was the classification of individual parcels within the dataset, specifically the layer titled “B_UID_Summary” (DWR Parcels).

We identified 393 parcels within this layer that had an “AG” (agricultural landscape) value greater than zero. These were interpreted as properties that contain residential agricultural landscaping. By summing the AG values across these 393 parcels, we calculated a total of 29,717,482 square feet of residential agricultural landscape. This value is referenced in cell B80 of the District’s Annual Urban Water Use Objective and Water Use Report for 2025 and is currently used in the variance volume calculation for residential agricultural landscape.

Discrepancies Identified Between LAM Data and BVWD GIS Data

Several inconsistencies were found between the LAM data and the District’s GIS data:

- The “AgLands_Mask” layer provided in the LAM package was intended to identify commercial agricultural areas. To validate this, we conducted a spatial join between AgLands_Mask and the BVWD Parcel Layer (exported from Shasta County’s Open Data Portal, with only customer information added from BVWD’s billing system).
- After performing this spatial join, we queried for AgLands_Mask features that intersect with parcels occupied by rural or residential customers. Results:
 - 16 features were located on rural customer parcels, totaling approximately 33 acres.
 - 113 features were located on residential customer parcels, totaling approximately 173 acres.

In total, 206 acres of agricultural landscape were excluded from residential classification but appear to qualify based on land use and thus should be considered as part of the Residential Agricultural Landscape figure.

Classification Issues with Rural Parcels

A significant concern was the high number of rural parcels classified with 0 AG area, despite visible evidence of pastures or gardens in aerial and satellite imagery. Specifically:

- Out of 1,698 rural parcels, 719 (42%) were classified with zero AG area.

This misclassification is potentially due to the drought conditions during the 2018 imagery capture used in the LAM project. As seen in the imagery examples provided, irrigated landscapes can fluctuate seasonally or annually.



June 10, 2020



March 7, 2024



July 31, 2025

District-Wide Agricultural Landscape Analysis

To further assess how agricultural areas were classified:

1. The 393 DWR-classified AG parcels were spatially joined to the internal BVWD parcel layer.
2. A new field was calculated to represent the percentage of each parcel's area identified as AG.

3. Summary statistics showed an average of 20% of parcel area classified as agricultural landscape by DWR.

To verify this figure, BVWD performed a manual delineation of agricultural landscape areas:

- A new GIS layer, BVWD Ag Mask, was created by digitizing visible agricultural areas within a sample of 120 rural parcels, using recent satellite imagery.
- For each parcel, the actual AG area was calculated and then expressed as a percentage of the parcel's total area (using a spatial join and field calculation with the parcel layer).
- Results showed an average AG area of 42% per parcel using this method



Example of BVWD Ag Mask

Alternative Area Calculations Based on Updated Analysis

BVWD's service area contains 6,817 total parcels, of which 1,698 are rural. Using GIS, the total area of rural parcels was calculated at 9,808 acres.

Method	% AG Area	Total Residential AG Landscape (sq ft)
BVWD Digitized Analysis	42%	179,420,000 sq ft

Request for Consideration of Alternative Data Submission

Based on the more accurate representation of irrigated agricultural landscapes on rural parcels, BVWD requests the approval of 179,420,000 square feet as the total residential agricultural landscape area, in accordance with the Residential Agricultural Variance process.

- This request is supported by a digitized, field-verified dataset using satellite imagery and GIS analysis.
- All supporting data is included in the accompanying file geodatabase (FGDB).

If the full 179 million square feet figure cannot be accepted under DWR standards for alternative data submission, at a minimum we request the approval of at least 85,421,160 square feet, based on DWR's own 20% average applied across all rural parcels.