

## Animal Agriculture Operations, 2025

Pace, C., Libenson, A., Tran, T., Cushing, L.J., Morello-Frosch, R. (2025). Animal Agriculture Operations. Drinking Water Tool Metadata, prepared by the Water Equity Science Shop, UC Berkeley.

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### File name

Animal\_ag\_PLSS\_022725.shp

### Spatial Reference

Geographic Coordinate System	NAD 1983	Projected Coordinate System	NAD 1983 (Teale) Albers (Meters)
WKID	4269	Projection	3310
Authority	EPSG	Authority	EPSG
Angular Unit	Degree (0.0174532925199433)	Linear Unit	Meters (1.0)
Prime Meridian	Greenwich (0.0)	False Easting	0.00
Datum	D North American 1983	False Northing	-4000000.0
Spheroid	GRS 1980	Central Meridian	-120.0
Semimajor Axis	6378137.0	Standard Parallel 1	34.0
Semiminor Axis	6356752.314140356	Standard Parallel 2	40.5
Inverse Flattening	298.257222101	Latitude of Origin	0.0

### Description

This shapefile represents approximate locations of various animal agriculture operations, including confined livestock areas, dairies, poultry facilities, aquaculture, and facilities with active or historical permits to discharge animal waste. Some, but not all of these facilities meet the definition of a Concentrated Animal Feeding Operation (CAFO) and/or Confined Animal Facility (CAF). CAFs are broadly defined by the state of California as places where animals are held and fed by means other than grazing ([link](#)).<sup>1</sup> Defined by US Environmental Protection Agency, CAFOs are a type of industrial-sized CAF that meet certain criteria for the number of animals and/or method of waste discharge ([link](#)).<sup>2</sup>

To construct this dataset, the Water Equity Science Shop (WESS) integrated spatial data that was developed by state and federal agencies. WESS aggregated the data to the scale of Public Land Survey System (PLSS) sections (i.e. 1x1 mile grid squares). The resulting dataset indicates the presence of one or more animal agriculture operation in each of the 3,507 PLSS sections.

### Methods

Below are the basic steps we followed to prepare data for this project.

1. Downloaded California Department of Conservation's Farmland Mapping Monitoring Program (FMMP), 2018 data.<sup>3</sup> This publicly available dataset classifies California's farmland into subcategories (i.e. prime farmland, farmland of local importance, etc.) based on land use, soil quality, and irrigation status. The FMMP has been tracking agricultural land use since 1984, and currently classifies land using aerial photographs and land visits. Non-irrigated land is further classified through the Rural Land Mapping Project—a subproject within the FMMP that currently covers 8 counties (Fresno, Kings, Placer, Riverside, Sacramento, San Joaquin, Sierra Valley, Tulare)- into rural residential land, rural commercial land, natural vegetation, and confined animal agriculture. WESS downloaded the most recently available FMMP data in

November 2024. Using ArcGIS Pro 3.2.0, we selected all polygons designated as confined animal agriculture, which includes poultry facilities, feedlots, dairy facilities, and fish farms.

2. Downloaded point locations of animal agriculture operations permitted to discharge animal waste. This data includes CAFOs regulated under the EPA’s National Pollution Discharge Elimination System (NPDES)<sup>4</sup> and all other types of CAFs required to comply with animal waste discharge standards set by the state of California.<sup>5</sup> The NPDES regulates point source polluters (i.e. pollution that originates from a distinct location), such as CAFOs, that discharge waste to waters of the United States. Individual states administer these EPA regulations. CAFs that do not meet the definition of a CAFO are classified as non-point sources of pollution and their waste is regulated differently. WESS accessed animal waste discharge permit data through the California State Water Resources Control Board’s California Integrated Water Quality System (CIWQS) regulated facilities reports [database](#).<sup>6</sup> WESS downloaded all active and historical permits (dating back to 1972) as a spreadsheet and mapped facilities according to the provided latitude/longitude data to create a point-dataset of facility locations in ESRI ArcGIS Pro 3.2.0. WESS flagged all facilities in the dataset that met the EPA’s definition of a CAFO based on animal population size,<sup>2</sup> following the methodology used by the Environmental Working Group (EWG).<sup>7</sup> WESS also included any facility that had been issued an NPDES permit, as indicated by the fields "Regulatory Measure Type" and "NPDES No." (N=1,596 active and historical CAFO permits).
3. Accessed Tax Assessors Parcel Data, 2018.<sup>8</sup> WESS used residential parcel data developed by LightBox. The dataset contains land parcels in California designated by primary use. WESS used the following selection criteria ("USE\_CODE\_STD\_DESC" == contains the text “poultry”, “dairy”, “cattle”, “aquaculture”; does not contain the text “brushland”, “timber”, “graze”, “grazing”, “irrig”) - variations on terms were also included.
4. Downloaded Bureau of Land Management Public Land Survey System (PLSS) Dataset, 2018.<sup>9</sup> The Bureau of Land Management developed a gridded identification system, referred to as the Public Land Survey System (PLSS) to describe land areas according to their Meridian, Township, Range, and Section (MTRS). PLSS sections are approximately 1x1 mile grid squares, interchangeably termed PLSS sections or MTRS.
5. We merged the parcel shapefile (Step 1) and FMMP shapefile (Step 3) into a composite polygon. Next, we intersected the composite polygon layer with PLSS sections, assigned PLSS section ID using the “identity” function and recorded the presence/absence of animal agriculture polygons within each PLSS section. We applied a sliver tolerance to eliminate slivers based on the following criteria (length>area and area<10% of polygon). Finally, we used the “summarize within” function to determine the presence/absence of a CAFO NPDES permit within each PLSS section. The resulting dataset indicates the presence/absence of animal agriculture operations and/or NPDES permitted CAFO discharge points within PLSS sections.

**Attribute table**

Field Heading	Field Description
FID	GIS generated ID
shape	Polygon

MTRS	Mountain Township Range Section (MTRS) identifier
AAg_poly_Y	"1" indicates the presence of one or more animal agriculture operation within the MTRS/PLSS section
Perm_Y	"1" indicates that one or more CAF/CAFO with an active animal waste discharge permit is located within the MTRS/PLSS section
Act_count	Count of active animal waste discharge permits in MTRS/PLSS section
Act_orHist	"1" indicates that one or more CAF/CAFO with an active or historical animal waste discharge permit is located within the MTRS/PLSS section
Hist_only	"1" indicates that one or more CAF/CAFO with a historical animal waste discharge permit is located within the MTRS/PLSS section
CAFO_y	"1" indicates the presence of at least one active or historical permitted CAFO in the MTRS/PLSS section.
CAFO_count	Count of active and historical permitted CAFOs in the MTRS/PLSS section.
AAg_Yes	"1" indicates the presence of one or more animal agriculture operation, active or historical animal waste discharge permit within the MTRS/PLSS section.
Shape_Length	ESRI generated
Shape_Area	ESRI generated

### Acknowledgements

Research conducted by the Community Engagement Core - Water Equity Science Shop of the UC Berkeley Superfund Research Program was supported by the National Institute of Environmental Health Sciences of the National Institutes of Health under Award Number P42ES004705. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

### References

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