

# LIDAR

LIGHT DETECTION AND RANGING

## Data for the Sacramento-San Joaquin Delta and Suisun Marsh

June 2019

### About LiDAR

LiDAR, or Light Detection and Ranging, is an aerial remote sensing method that uses a pulsed laser to measure ranges or distances to the Earth. LiDAR equipment, which includes a laser scanner, a Global Positioning System (GPS), and an Inertial Measurement Unit (IMU), is mounted on a small aircraft. The light pulses, combined with other data recorded by the system, generate precise, three-dimensional information about the features of the landscape and its surface characteristics.

### How LiDAR Data is Used

LiDAR data allow for a variety of different applications, analyses, visualizations, and advanced map production.

#### LiDAR is commonly used to

- make high-resolution maps
- develop contours
- create digital terrain models

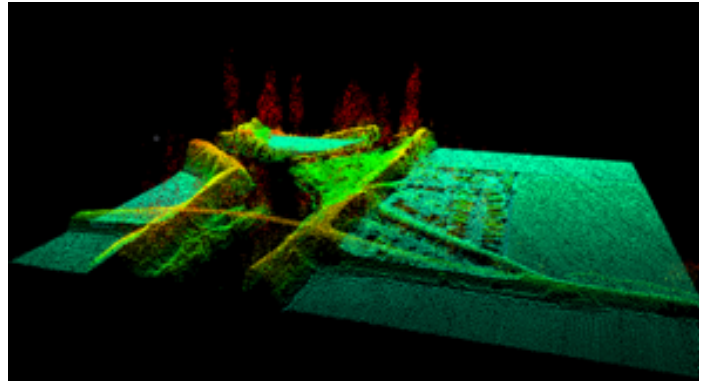
#### LiDAR applications are used by many different professionals including

- water managers
- environmental scientists
- engineers
- geologists
- archaeologists

#### DWR uses LiDAR data for the following

- environmental restoration
- subsidence monitoring
- modeling
- flood management
- levee maintenance

Elevation data obtained through LiDAR are vital in identifying levees that require maintenance or for assessing suitable locations for habitat restoration projects. LiDAR can also be used to develop maps that track subsidence and provide high-resolution resource information from a landscape-scale down to individual vegetated areas that would otherwise be difficult to obtain through ground-based observations. Benefits of LiDAR technology include reduced scientific uncertainty, reliable regional information, and improved communication.



*LiDAR graphical representation*

### 2017 Delta LiDAR Dataset - Technical Specifications

This dataset includes LiDAR topographic data for the statutory Sacramento-San Joaquin Delta (Delta) and Suisun Marsh collected during a survey in the winter of 2017. The winter 2017 collection timeframe allowed for deciduous trees to be bare, allowing maximum LiDAR penetration in vegetated areas. The United States Geological Survey (USGS) and DWR collaborated to acquire high-resolution, Quality Level 1 LiDAR data and developed derived elevation products covering an area of approximately 1,312 square miles. LiDAR data, and derivative products are based on the U.S. Geological Survey National Geospatial Program LiDAR Base Specification Version 1.2.

The specification may be viewed at <http://pubs.usgs.gov/tm/11b4>.

- Data is provided as bare earth Digital Elevation Model (DEM) grids in .las (full classified point cloud) and in Environmental Systems Research Institute (ESRI) Grid (shapefile) format with .5-meter cell size.
- Elevations are in feet.
- Survey points of accuracy theoretically capable of supporting 1-foot contours.
- Other data products include concurrent natural color orthoimagery, raw LiDAR point cloud data, and LiDAR return intensity imagery.

Elevation Quality Levels (QL)	Source	Vertical Accuracy Terms		Horizontal Resolution Terms		
		Vertical RMSE <sub>Z</sub>	Equivalent Contour Accuracy	Point Density	Nominal Pulse Spacing (NPS)	DEM Grid Cell Size
QL1	LIDAR1	0.0cm	1-ft	8 pts/m <sup>2</sup>	0.35m	3DEP DEM Cell Size~0.5m

Delta LiDAR data was developed under an agreement between the California Department of Water Resources (DWR) and the USGS through the USGS National Geospatial Program, with Woolpert as the lead LiDAR survey contractor. Funding was provided by DWR and a consortium of federal agencies through the USGS 3D Elevation Program.

### Access to the Dataset

Find the dataset at <http://gisarchive.cnra.ca.gov/iso/ImageryBaseMapsLandCover/LIDAR/DeltaLIDAR2017/>

### Contact Information

For more information or questions on this dataset, contact Joel Dudas at [Joel.Dudas@water.ca.gov](mailto:Joel.Dudas@water.ca.gov).

### Disclaimer

Data was collected during the winter of 2017 and delivered to DWR in 2019. These data are public domain. This dataset was not produced by DWR. Data were originally developed and supplied by USGS. DWR makes no warranties or guarantees

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