

# MARIN COUNTYWIDE LIDAR DERRIVED HYDROGRAPHY

**A COMPONENT OF THE MARIN COUNTYWIDE FINE SCALE VEGETATION  
MAP AND LANDSCAPE DATABASE PROJECT**



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# ESTABLISHED PARTNERSHIP



**“perhaps the highest priority need for assessing condition and trend of key vegetation community and rare plant indicators is having accurate and consistent mountain-wide spatial vegetation data.”**

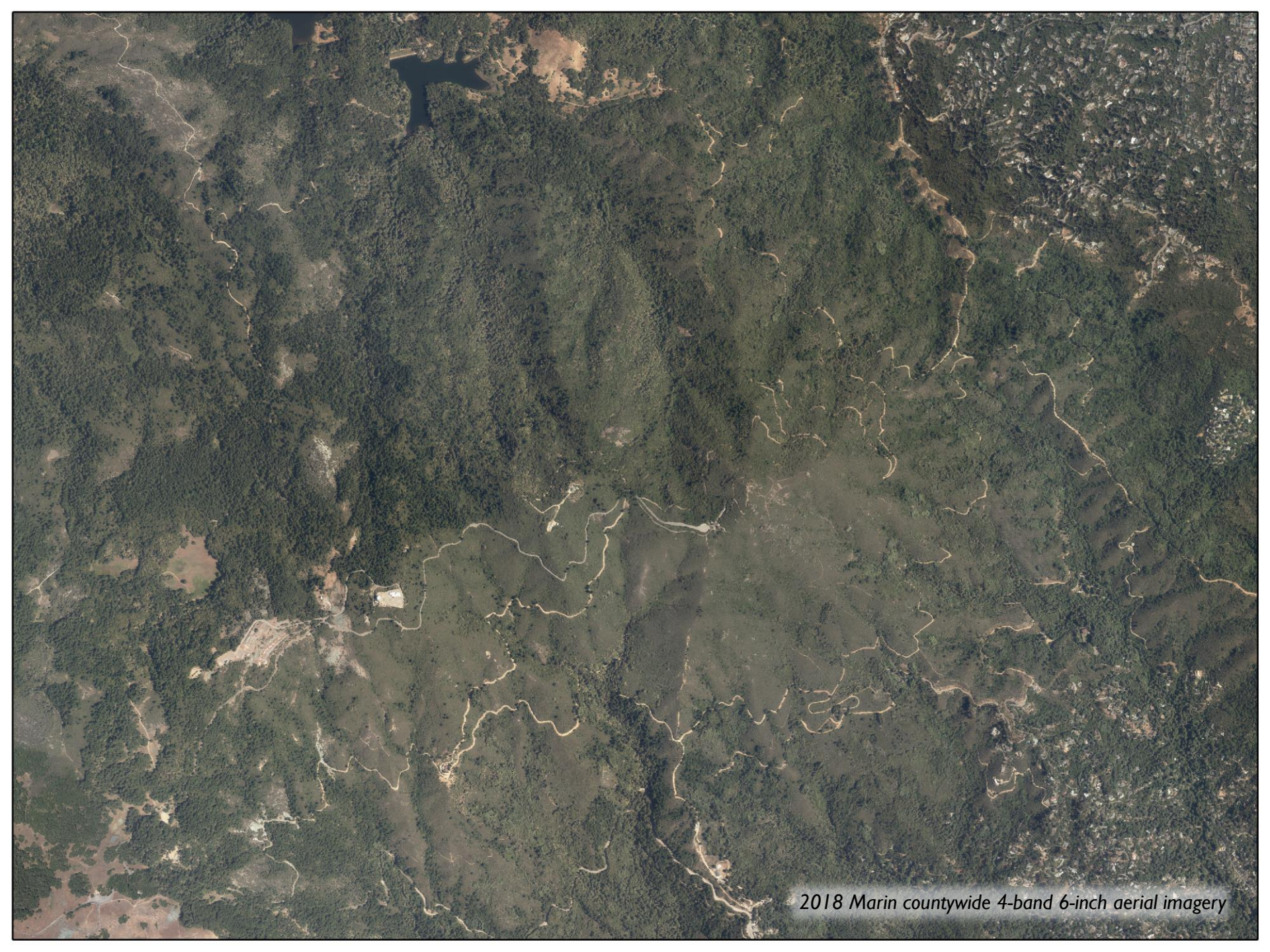


## PRODUCTS AND SCHEDULE

Milestone	Status
6-inch, 4-band ortho imagery acquisition and post processing	Completed June 2018
Vegetation Field Sampling for floristic classification	Completed July 2019
QLI Lidar Acquisition	Completed Winter 2019
1-foot countywide lidar derived contours	Completed December 2019
Additional lidar derived products (DEM, DSM, hillshade, raw ladder fuels raster, canopy height model, canopy closure model, etc.)	Completed January 2020
Draft Vegetation Lifeform Map	Completed March 2020
Lidar derived hydrological system mapping (NHD update)	In process
Marin countywide vegetation classification analysis, descriptions and key	In process
Countywide lidar derived impervious surfaces layer upgrade	In process
Draft Fine Vegetation Scale Map to local expert review	February 2021
Complete Fine Scale Vegetation Map	May 2021
Accuracy Assessment and Final Report	June/July 2021

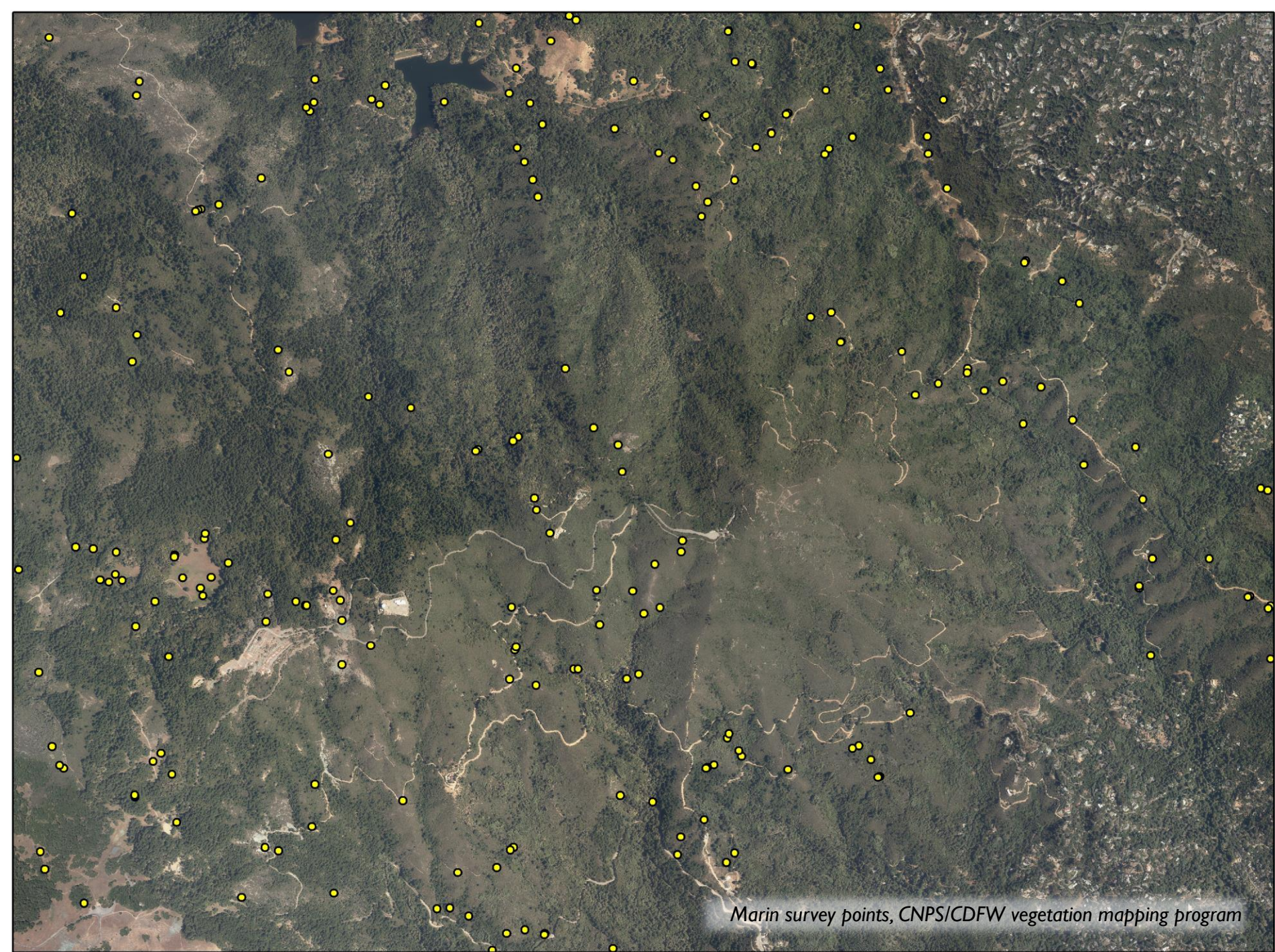
“To effectively care for ecosystems and infrastructure, citizens, landowners, politicians, scientists, stewards and agencies must know the location and distribution of resources across the landscape.”



This is a high-resolution aerial photograph of a large, forested area in Marin County, California. The terrain is covered in dense, dark green forest. A network of light-colored, winding roads or trails is visible throughout the landscape. In the upper left, there is a dark, irregularly shaped body of water, likely a reservoir or a large pond. The overall image has a slightly grainy texture, characteristic of aerial photography. The text "2018 Marin countywide 4-band 6-inch aerial imagery" is located in the bottom right corner.

2018 Marin countywide 4-band 6-inch aerial imagery



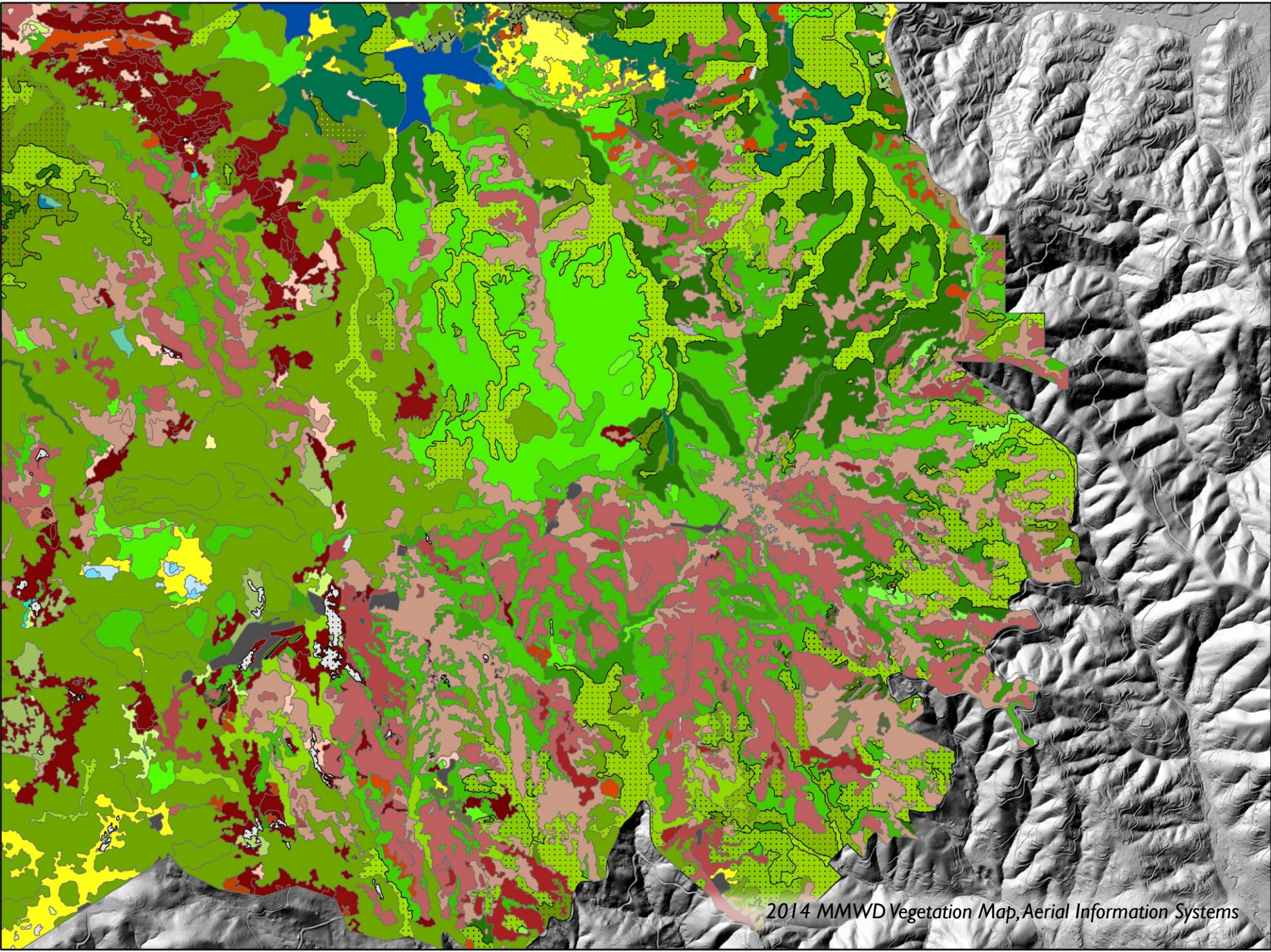


Marin survey points, CNPS/CDFW vegetation mapping program



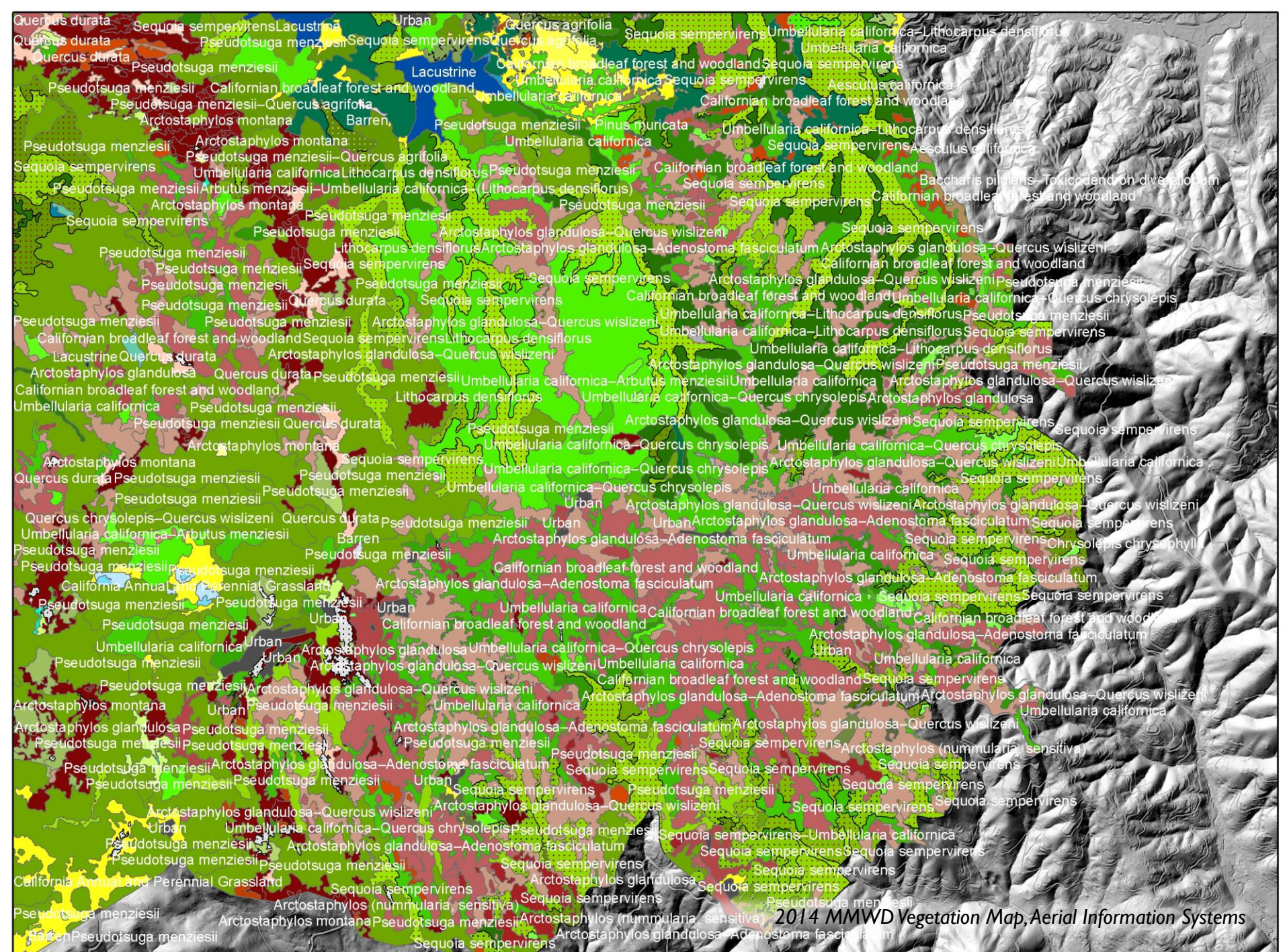




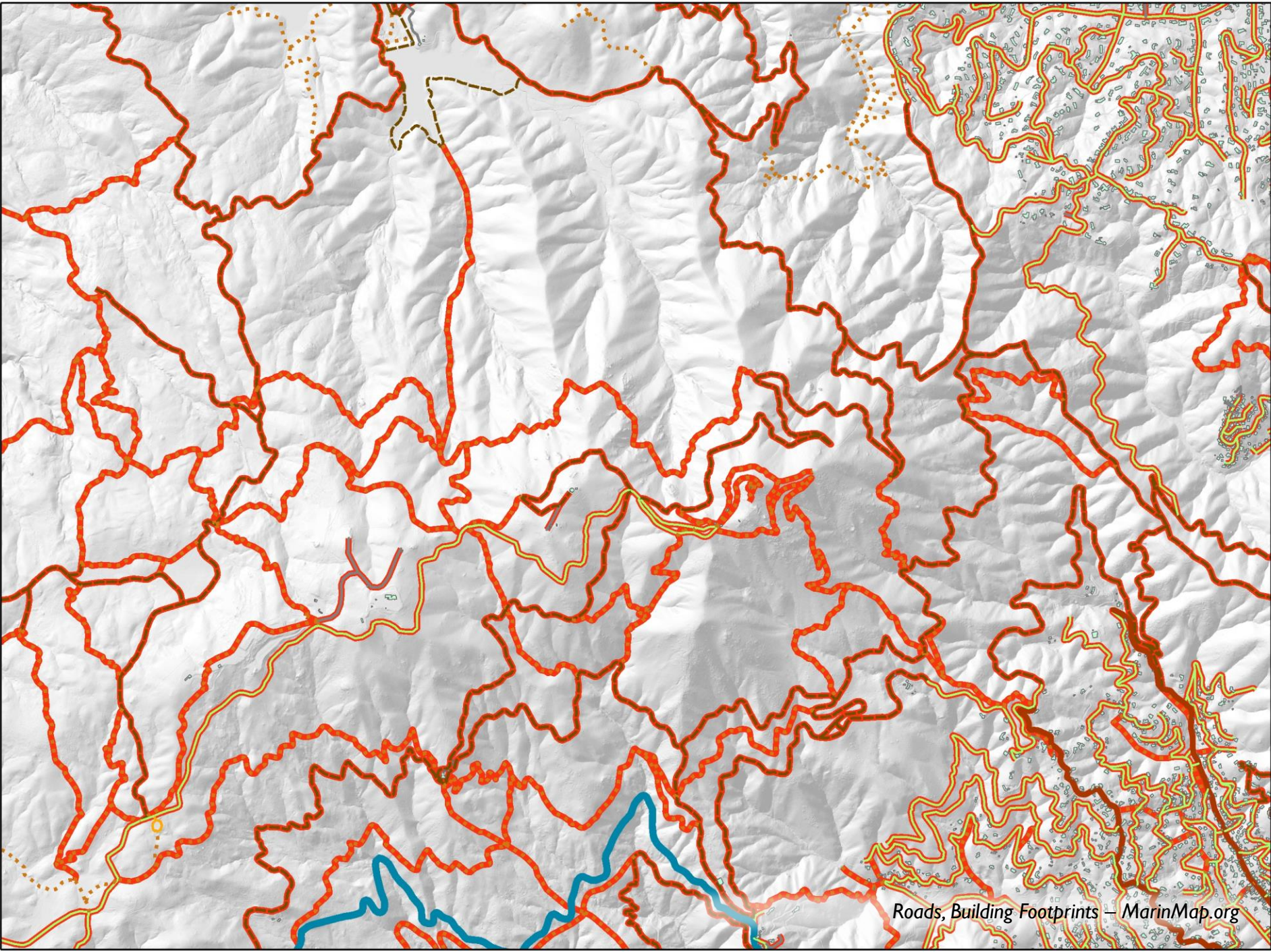


2014 MMWD Vegetation Map, Aerial Information Systems

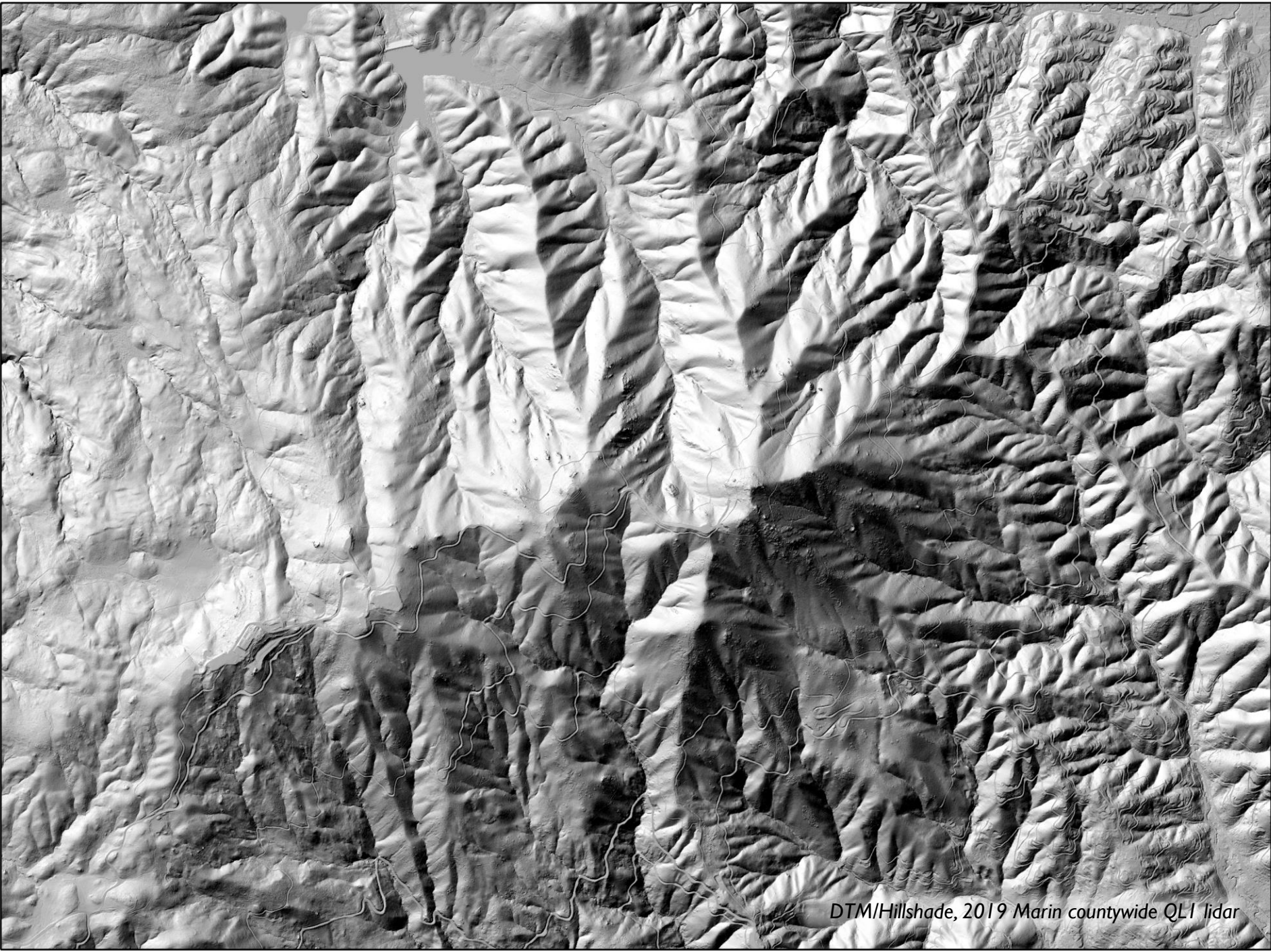






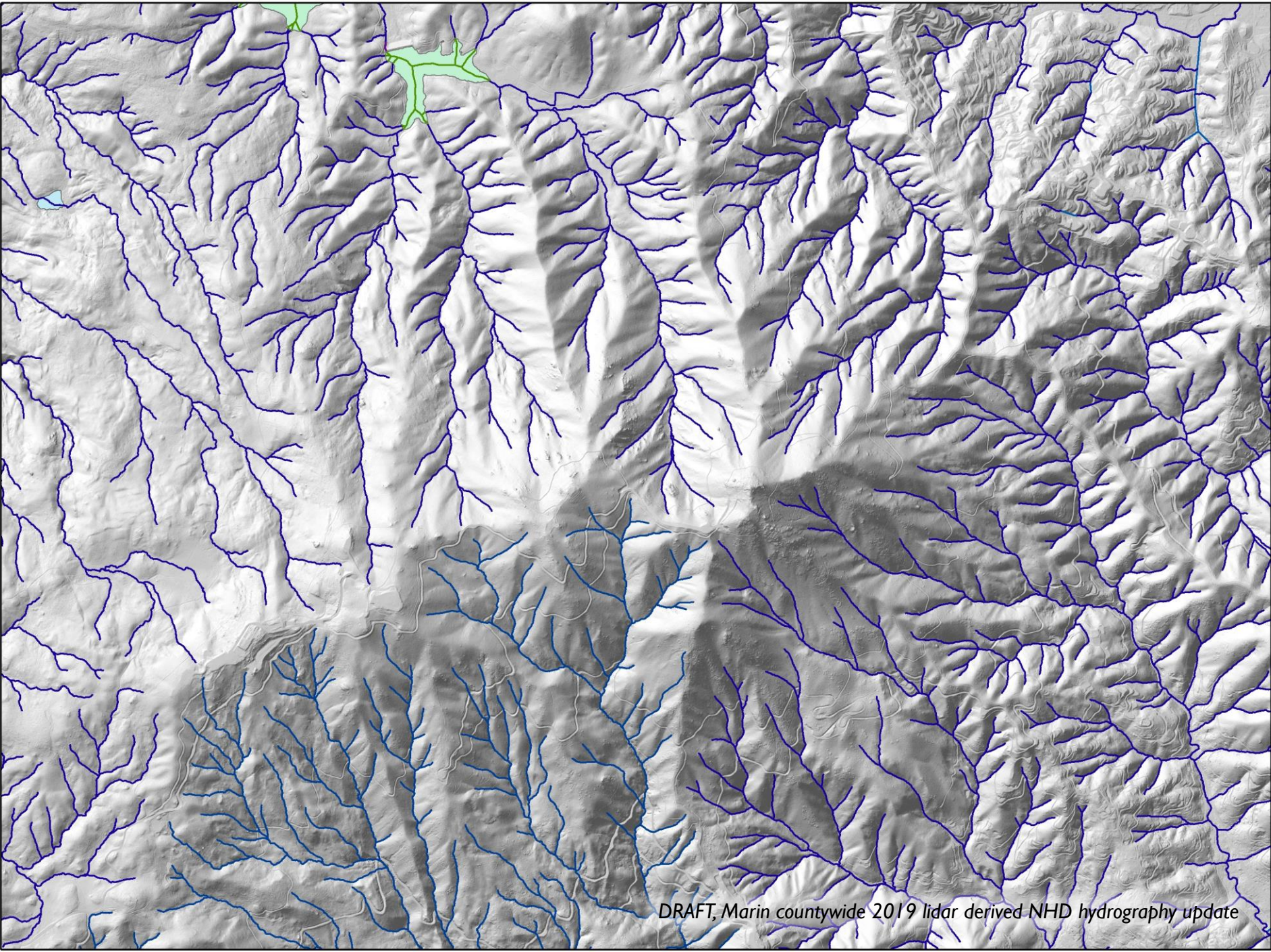






DTM/Hillshade, 2019 Marin countywide QLI lidar



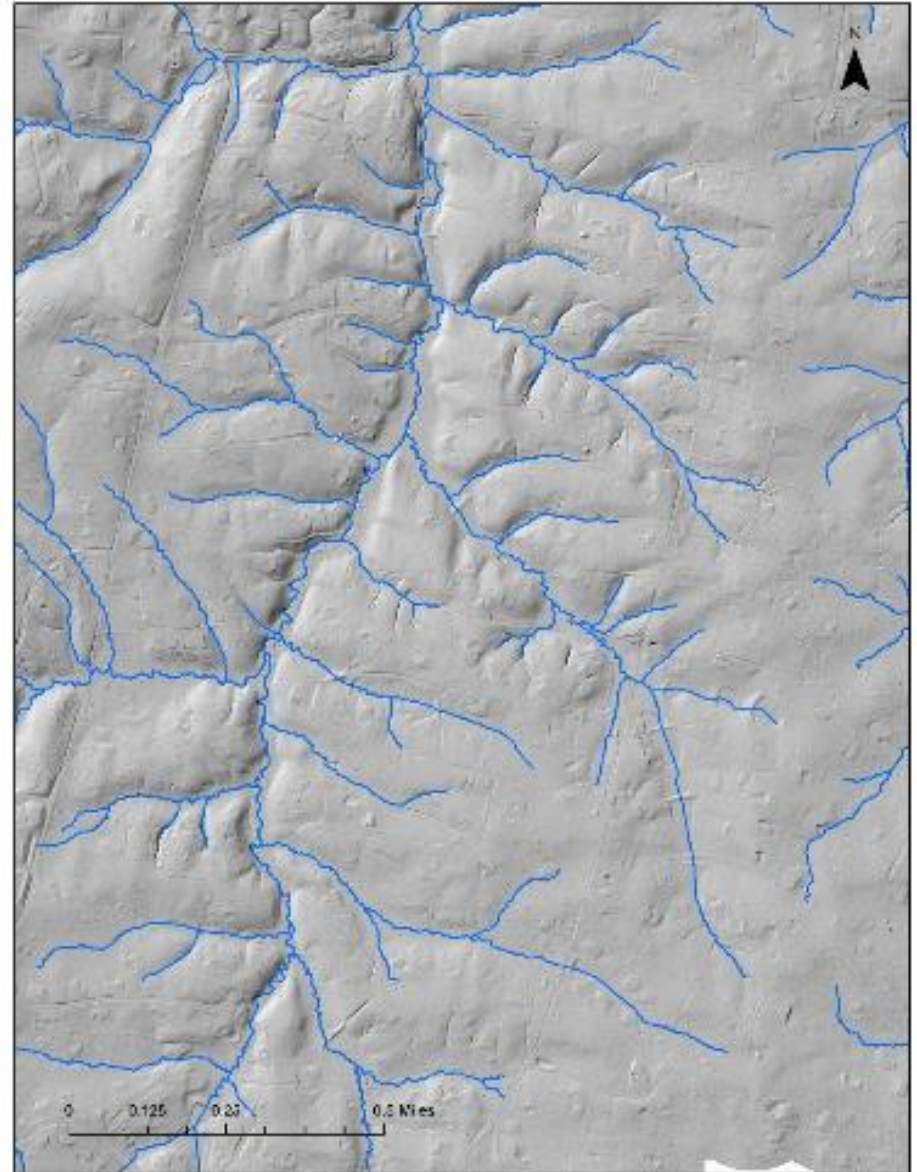


DRAFT, Marin countywide 2019 lidar derived NHD hydrography update



# Level 1: Streamlines and Water Bodies

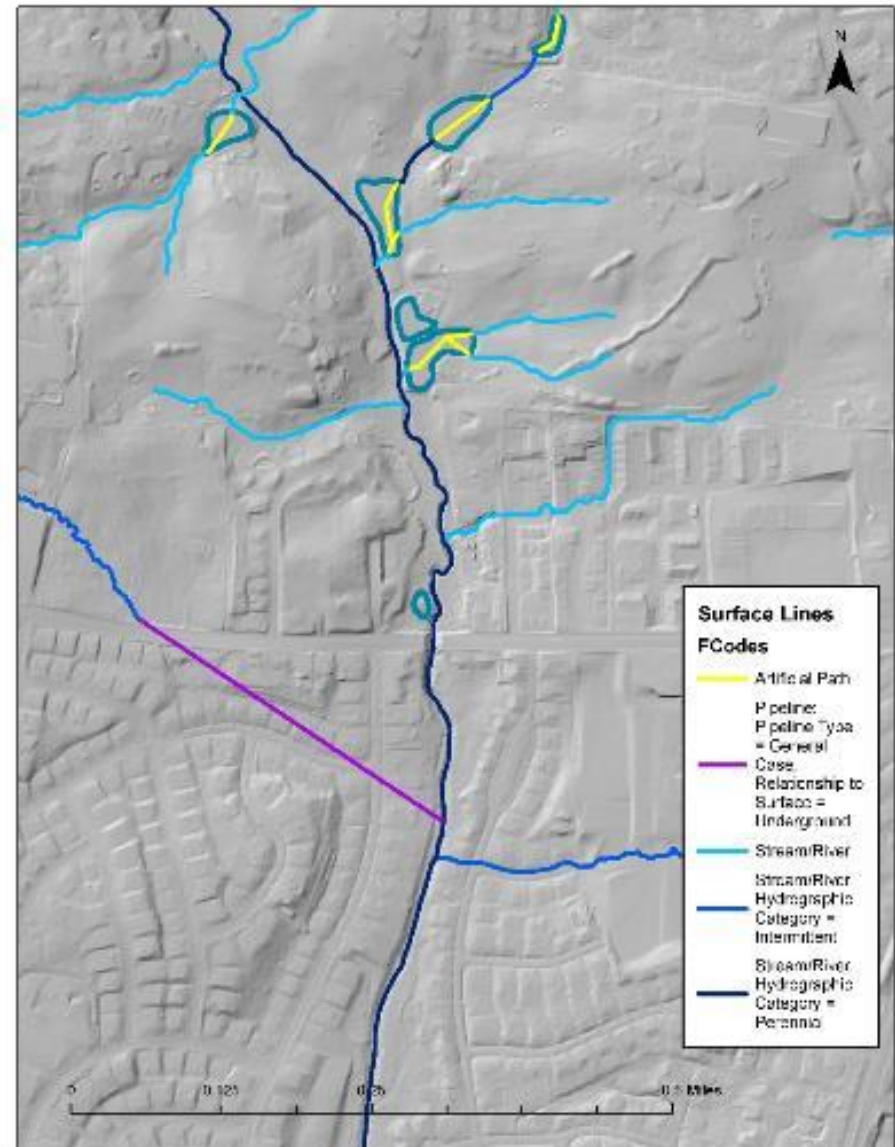
- Creates the streamlines from the LiDAR, connects surface streams with visible channelization together
- Only underground features represented are culverts
- Will include delineating waterbodies
- Will have topologically correct network smoothing (x,y smoothing) for visible channels
- Does not include any attribution
- Creation of culvert location database is possible





# Level 2: Network and Features

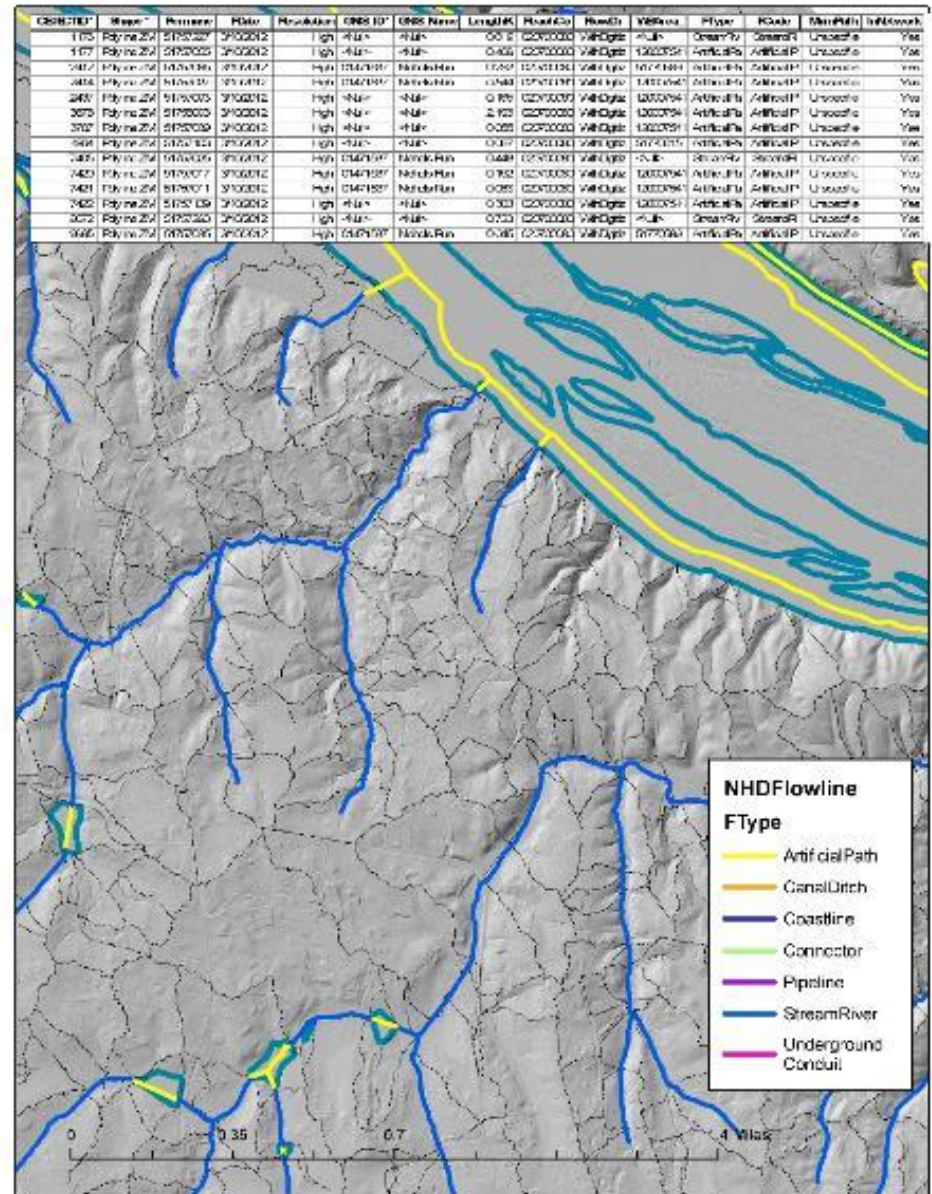
- Creates network connectivity elements that are not characterized by visible surface flow features. Adds below ground pipes where data available (not storm sewer systems)
- Will include centerlines/artificial paths through waterbody polygons
- Integrates attribution from current NHD
- Assign elevation values and enforce topologically consistent downstream flow (z smoothing) for full network connectivity
- Attribution of features based on available data with type of streamline or water body (Feature Types and Feature Codes)
- Creation of watershed boundaries HUC 12 and smaller





## Level 3: NHD and WBD Integration

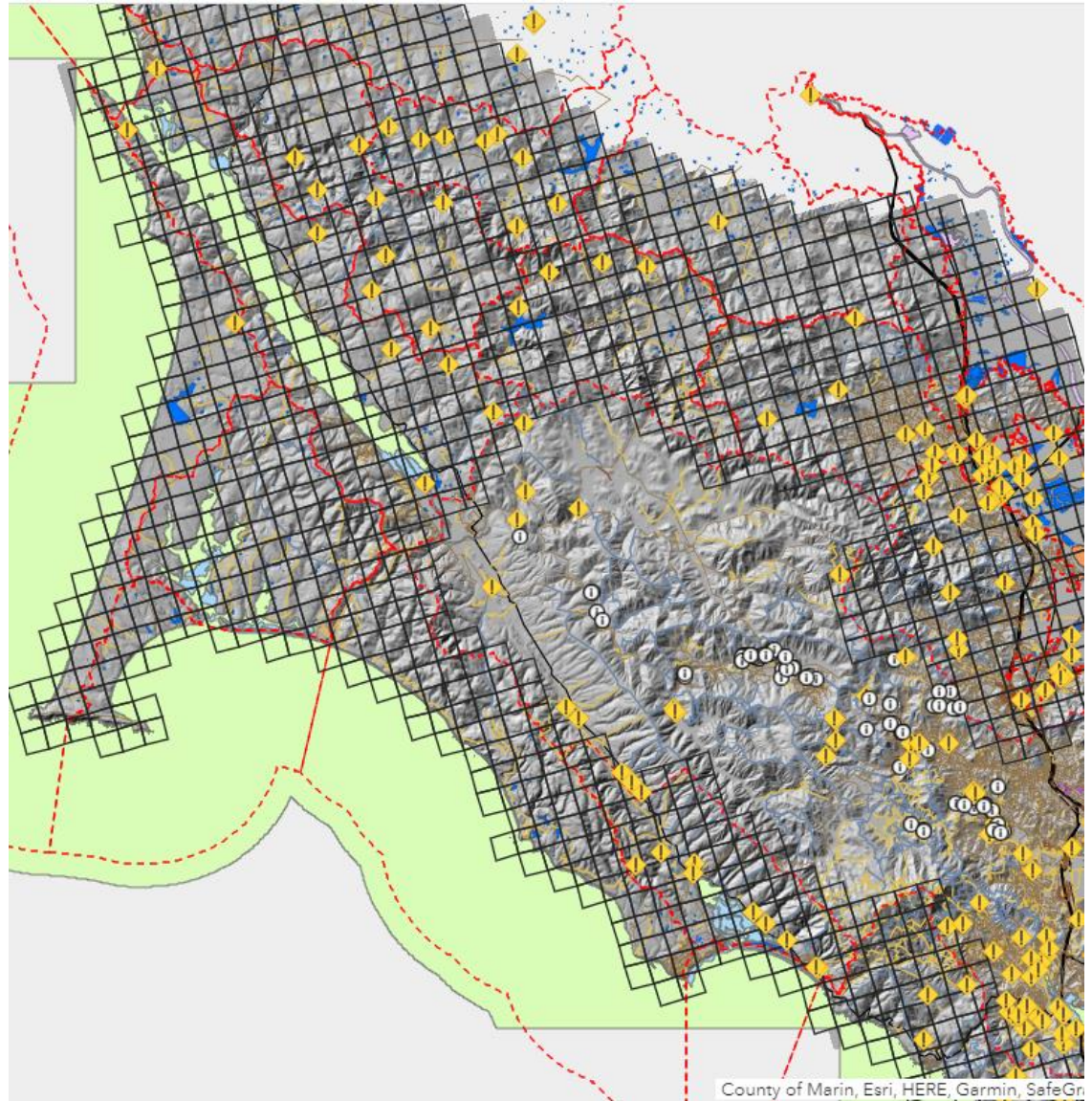
- Capture additional features such as dikes, weirs, dams and other connectors (exclusive of CSO pipelines)
- GeoConflate (Assign Geographic names and Reachcodes) to features
- Runs through NHD QC tools and post data to USGS for incorporation into NHD
- Iterative work with State steward to get data approved by USGS for NHD approval
- Load data into NHD
- Attribution of watershed boundaries and integration into the Watershed Database (WBD)





# Keys to Success / Process

- Iterative development with local stakeholder engagement – locally driven process.
- Ingestion of existing local data and knowledge
- Multiple phases of review of pilot areas by local stakeholders and experts; facilitated by web map application
- Early and ongoing involvement of CA State NHD Steward (DWR) and USGS GeoConflation expert





# Questions?

## **THANK YOU!**

**GOLDEN GATE NATIONAL PARKS CONSERVANCY  
ONE TAM MEMBERS AND PARTNERS:**

**NPS, MARIN COUNTY PARKS, STATE PARKS – BAY  
AREA DISTRICT & MMWD**

**CNPS/CDFW VEGETATION MAPPING PROGRAM**

**TUKMAN GEOSPATIAL**

**QUANTUM SPATIAL**

**KASS GREEN & ASSOCIATES**

**VANCE RUSSELL**

**MIKE VASEY – NERR**

**SHELLY BENSON**

**JOSH COLLINS - SFEI**

**NATE HEROLD – NOAA, COASTAL MGMT.**

**GREATER FARALLONES ASSOC. & NMS**

**MALT & MARIN RCD**

**USGS 3DEP & CA DWR**

**CA STATE COASTAL CONSERVANCY**

**CA NATURAL RESOURCES AGENCY**

**SONOMA AG + OPEN SPACE**

**CA LANDSCAPE STEWARDSHIP NETWORK**

Please email me to receive future  
product updates and data access

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