MARIN COUNTYWIDE LIDAR DERRIVED HYDROGRAPHY

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



Danny Franco
Project Manager
Golden Gate National Parks Conservancy
December 12, 2020



ESTABLISHED PARTNERSHIP



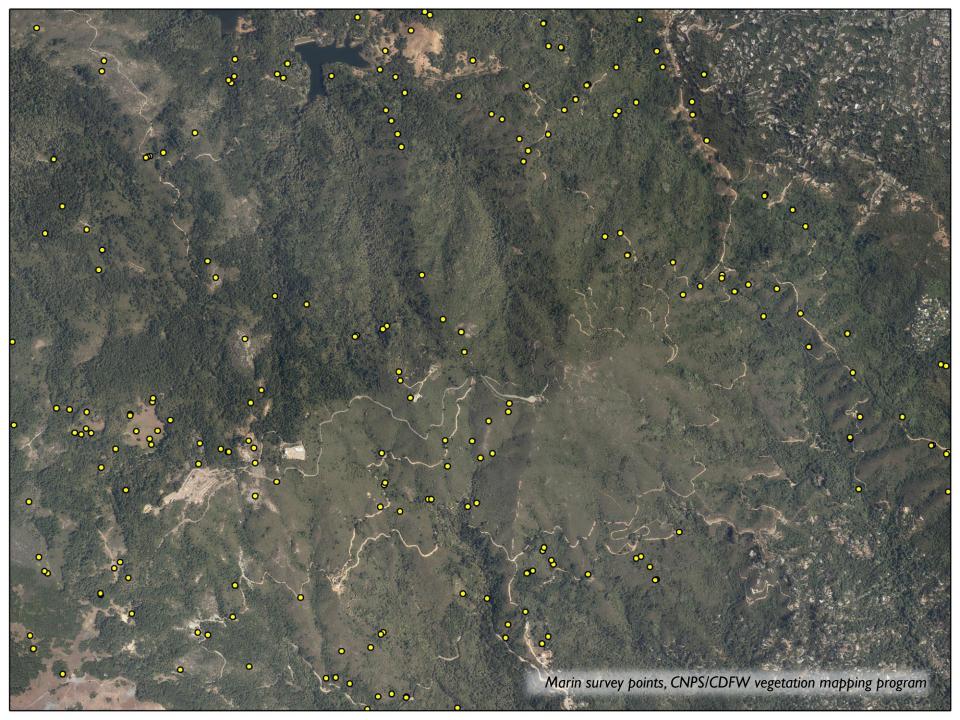
"perhaps the highest priority need for assessing condition and trend of key vegetation community and rare plant indicators is having accurate and consistent mountain-wide spatial vegetation data."

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
I-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."





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Festuca californica
                                           Arbutus menziesii – (Quercus agrifolia) Pteridium aquilinum – Grass
                                                                                                                           Sequoia sempervirens - Acer macrophyllum - Umbellularia californic
                                                                            Danthonia californica – Nassella pulchra
                 Thermopsis californica – Bromus carinatus – Annual Brome
                                                                                                             Adenostoma fasciculatum - Diplacus aurantiacus
                                                                                  latifolia, angustifolia)
                 Arctostaphylos montana
                                                                                                                                             Sequoia sempervirens – Umbellularia californica
                                                                                                       Sequoia sempervirens – Arbutus menziesii / Vaccinium ovatum
                                          Arbutus menziesii – (Quercus agrifolia) Acer macrophyllum
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                             Quercus agrifolia - Arbutus menziesii - Umbellularia californica Arbutus menziesii - (Quercus agrifolia)
                                          Chrysolepis chrysophylla – Arctostaphylos glandulosa Quercus wislizeni - Arctostaphylos glandulosa Eriodictyon californicum / Herbaceous
                                   Arctostaphylos montana
                                                                              Quercus parvula (shrub)
                                                                                                            Arctostaphylos glandulosa – Quercus wislizeni
                                                                             Chrysolepis chrysophylla / Vaccinium ovatum
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                           Arctostaphylos glandulosa

    Arctostaphylos glandulosa – Quercus wislizeni

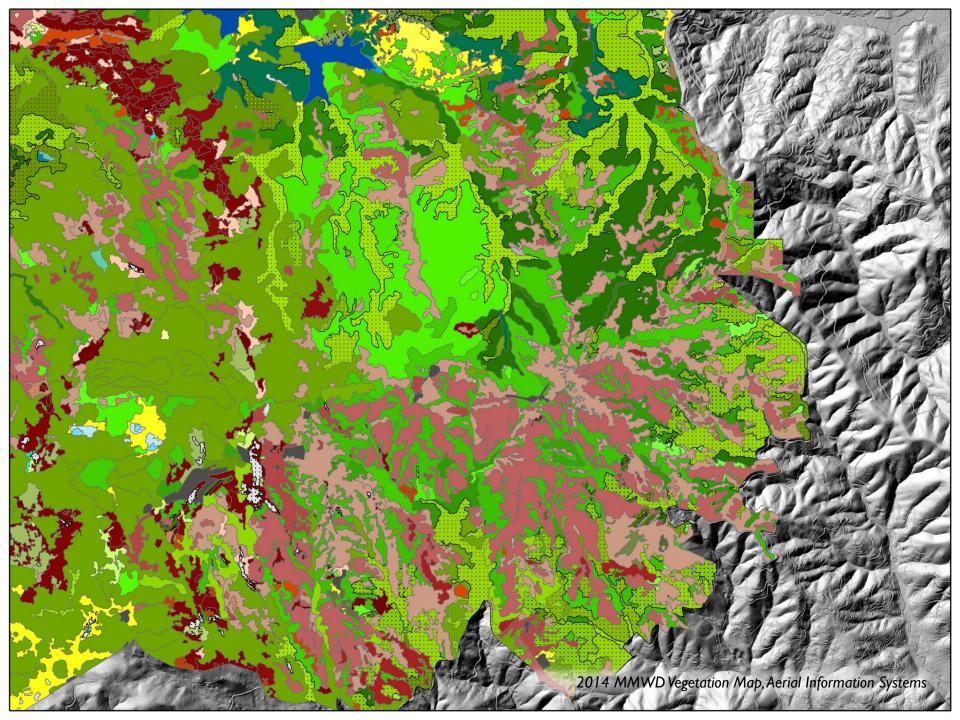
                          Adenostoma fasciculatum Serpentine

    Pseudotsuga menziesii – Chrysolepis chrysophylla – Notholithocarpus densiflorus

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          Pseudotsuga menziesii – Arbutus menziesii
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             Arctostaphylos montana
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                 Carex amplifolia
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    Arbutus menziesii – Umbellularia californica

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Quercus wislizeni – Arctostaphylos glandulosa
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                                              Arctostaphylos montana
         Notholithocarpus densiflorus
                            Adenostoma fasciculatum Serpentine Arctostaphylos sensitiva
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Pinus muricata
Umbellularia californica—Lithocarpu den
Umbellularia californica
Sequoia sempervirens
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Umbellularia californica-Lithocarpus densiflorus
  Arctostaphylos glandulosa—Quercus durata Pseudotsuga menziesii Umbellularia californica—Arctostaphylos glandulosa—Quercus wislizeni Pseudotsuga menziesii Umbellularia californica—Arbutus menziesii Umbellularia californica Arctostaphylos glandulosa—Quercus wislizeni Pseudotsuga menziesii Umbellularia californica Arctostaphylos glandulosa—Quercus wislizeni Pseudotsuga menziesii Umbellularia californica—Quercus chrysolepis Arctostaphylos glandulosa

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Pseudotsuga menziesii Quercus durata

Arctostaphylos glandulosa—Quercus wislizeni Sequoia sempervirens

Arctostaphylos montana

Sequoia sempervirens

Umbellularia californica—Quercus chrysolepis Arctostaphylos glandulosa—Quercus wislizeni Umbellularia californica—Quercus chrysolepis Arctostaphylos glandulosa—Quercus wislizeni Umbellularia californica—Quercus chrysolepis

Sequoia sempervirens

Umbellularia californica—Quercus chrysolepis

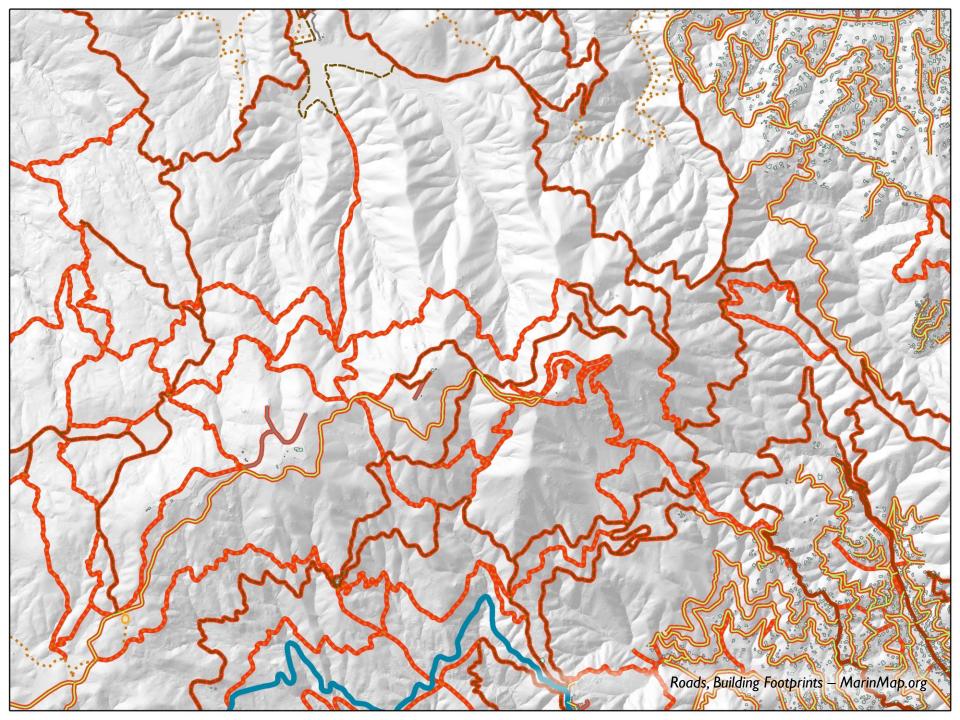
Sequoia sempervirens

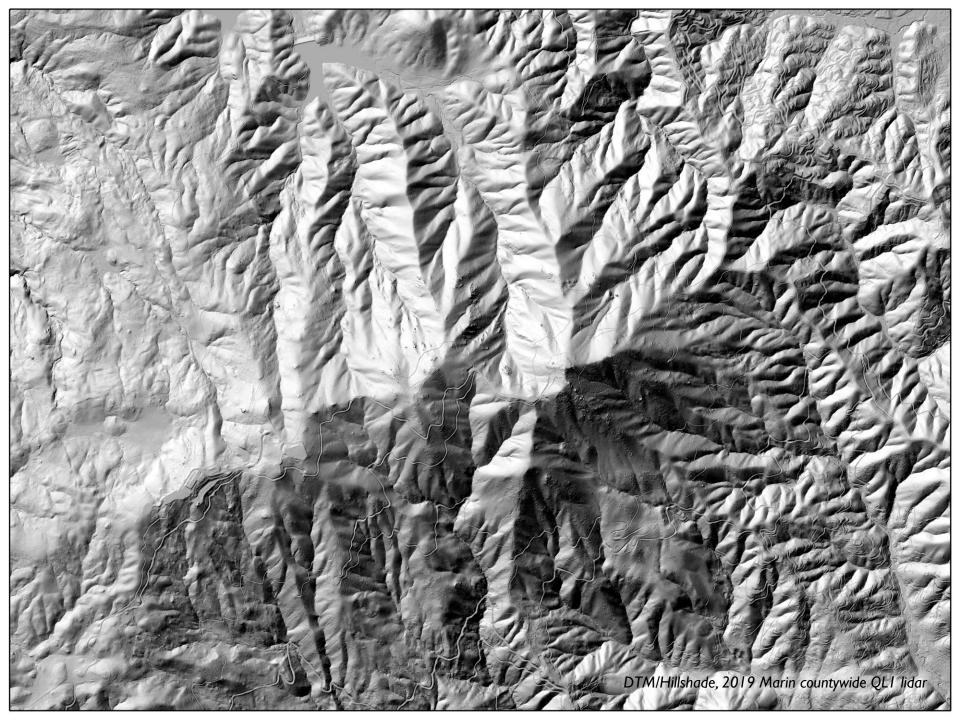
Sequoia sempervirens

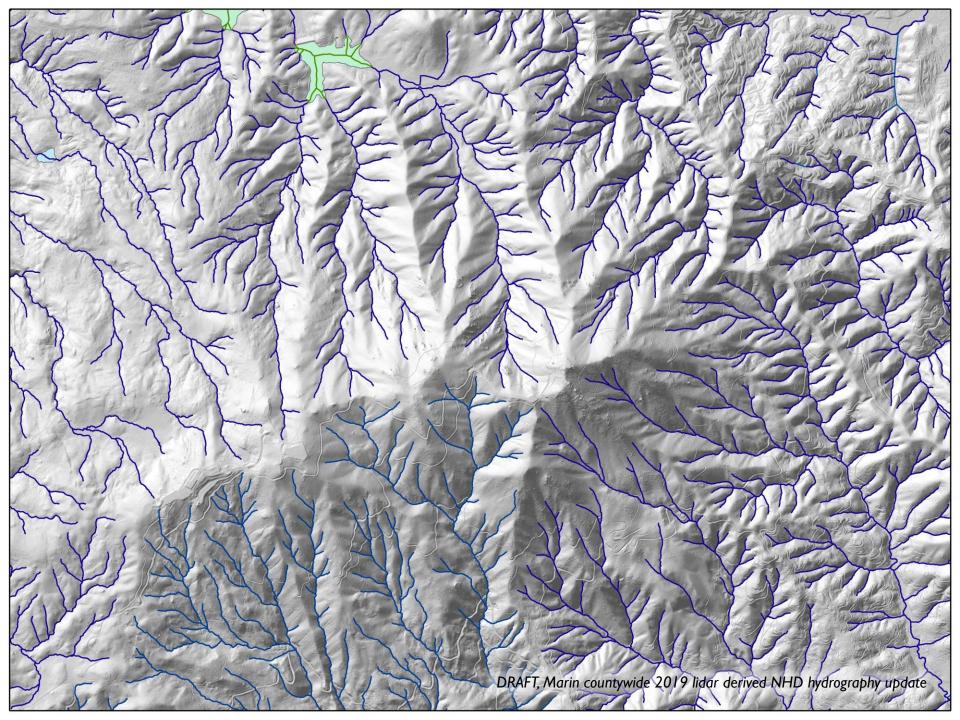
Sequoia sempervirens

Sequoia sempervirens

Arctostaphylos glandulosa—Quercus wislizeni Arctostaphylos glandulosa—Quercus wislizeni Arctostaphylos glandulosa—Adenostoma fasciculatum Sequoia se
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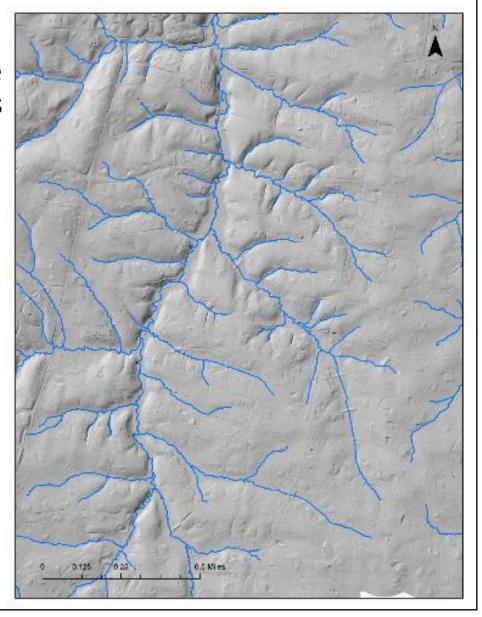






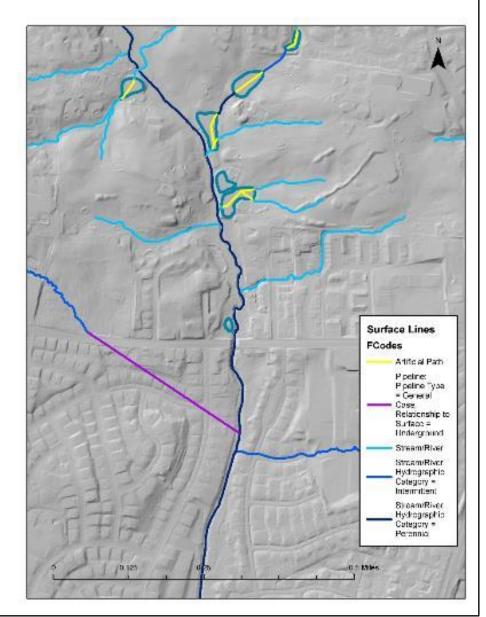
Level 1: Streamlines and Water Bodies

- 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



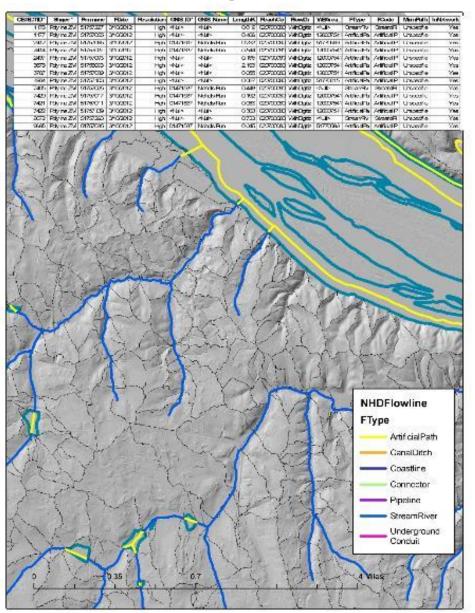
Level 2: Network and Features

- 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



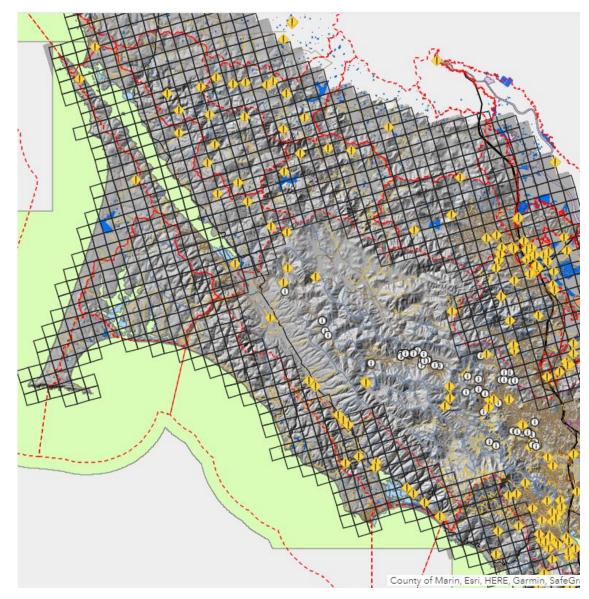
Level 3: NHD and WBD Integration

- Capture additional features such as dikes, weirs, dams and other connectors (<u>exclusive</u> 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





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 OUANTUM 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

THE REAL PROPERTY.

Please email me to receive future product updates and data access

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