CA Status Update on Producing and Contributing Elevation-Derived Hydrography for 3DHP

CGIA Community Forum: LiDAR for California

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CGST CENTER FOR GEOSPATIAL SCIENCE & TECHNOLOGY California State University, Northridge

Joel Osuna-Williams

Senior Project Manager

Center for Geospatial Science and Technology

CSU, Northridge

California State University Chico North State Planning and Development Collective

Erik Fintel

Project Manager

North State Planning and Development Collective

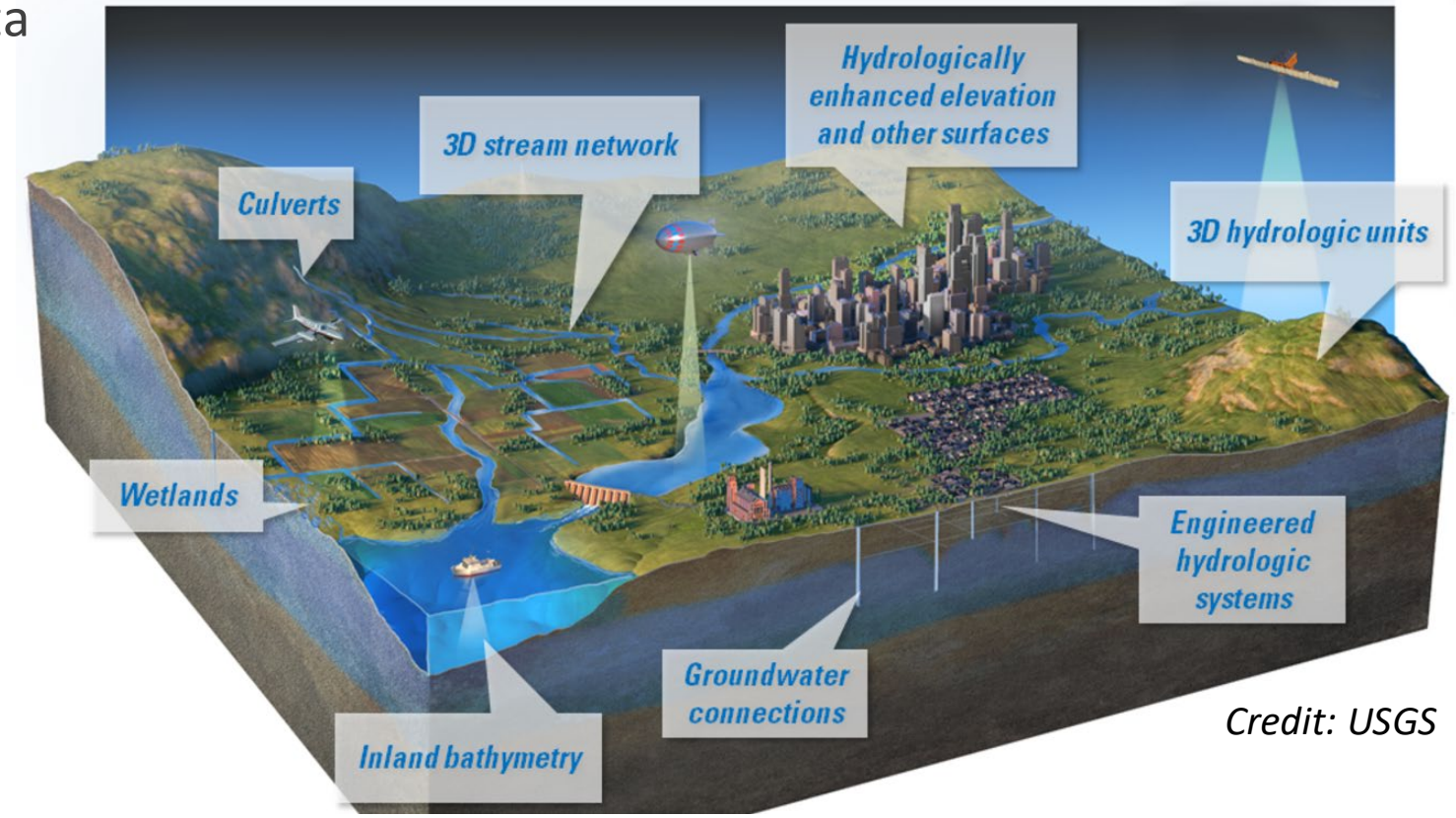
Geographical Information Center

CSU, Chico

3D Hydrography Program

- NHD, WBD, and NHDPlus have become static.
- USGS has transitioned to the 3D Hydrography Program.
- Hydrography derived from 3D Elevation Program (3DEP) LiDAR data
  - ✓Elevation-Derived Hydrography: **EDH**
  - ✓Data model + schema
  - ✓Data specifications
- Improved spatial accuracy and feature density

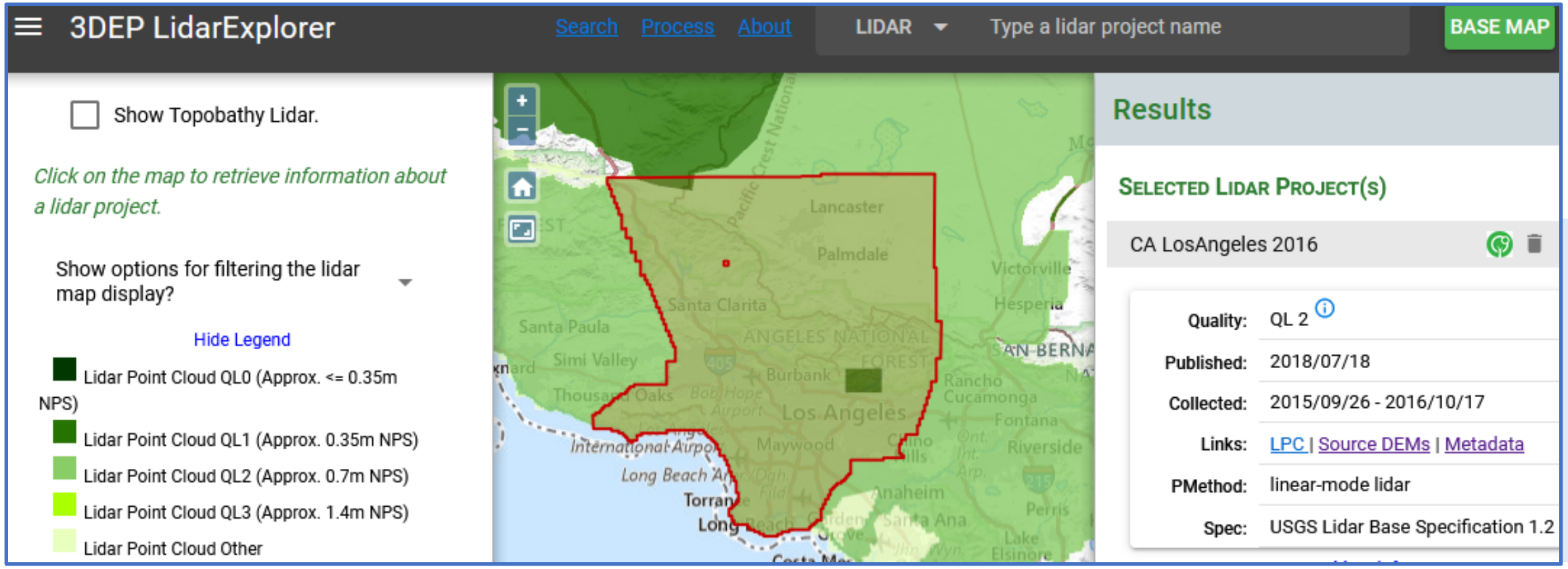
High resolution elevation and bathymetry data and derived, high-fidelity hydrography and other data derivates "***from the depths of our oceans to the peaks of our mountains***."



Credit: USGS

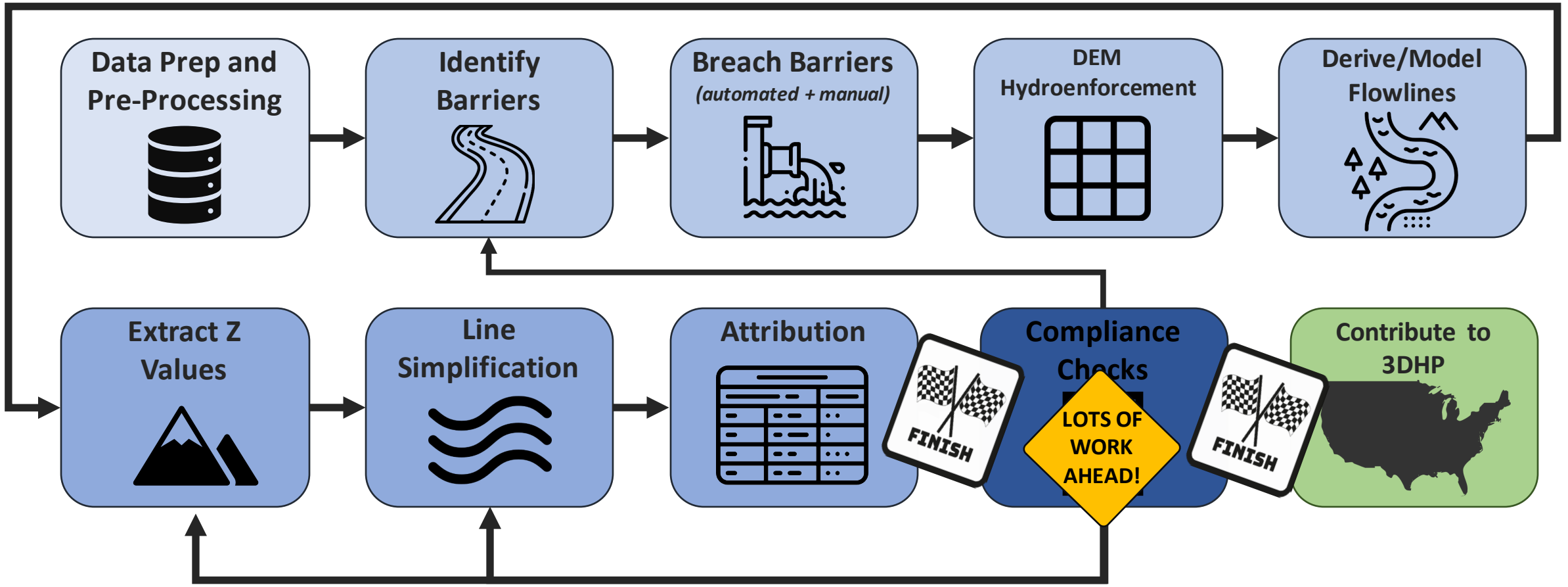
LiDAR for Hydrography Production

- USGS 3DEP LiDAR is Required
  - At Quality Level 2
  - *Or* at Quality Level 1
- Original Product Resolution DEMs
  - Used at/resampled to 1 meter resolution



USGS 3DEP LiDAR Explorer App

Hydro Derivation Process



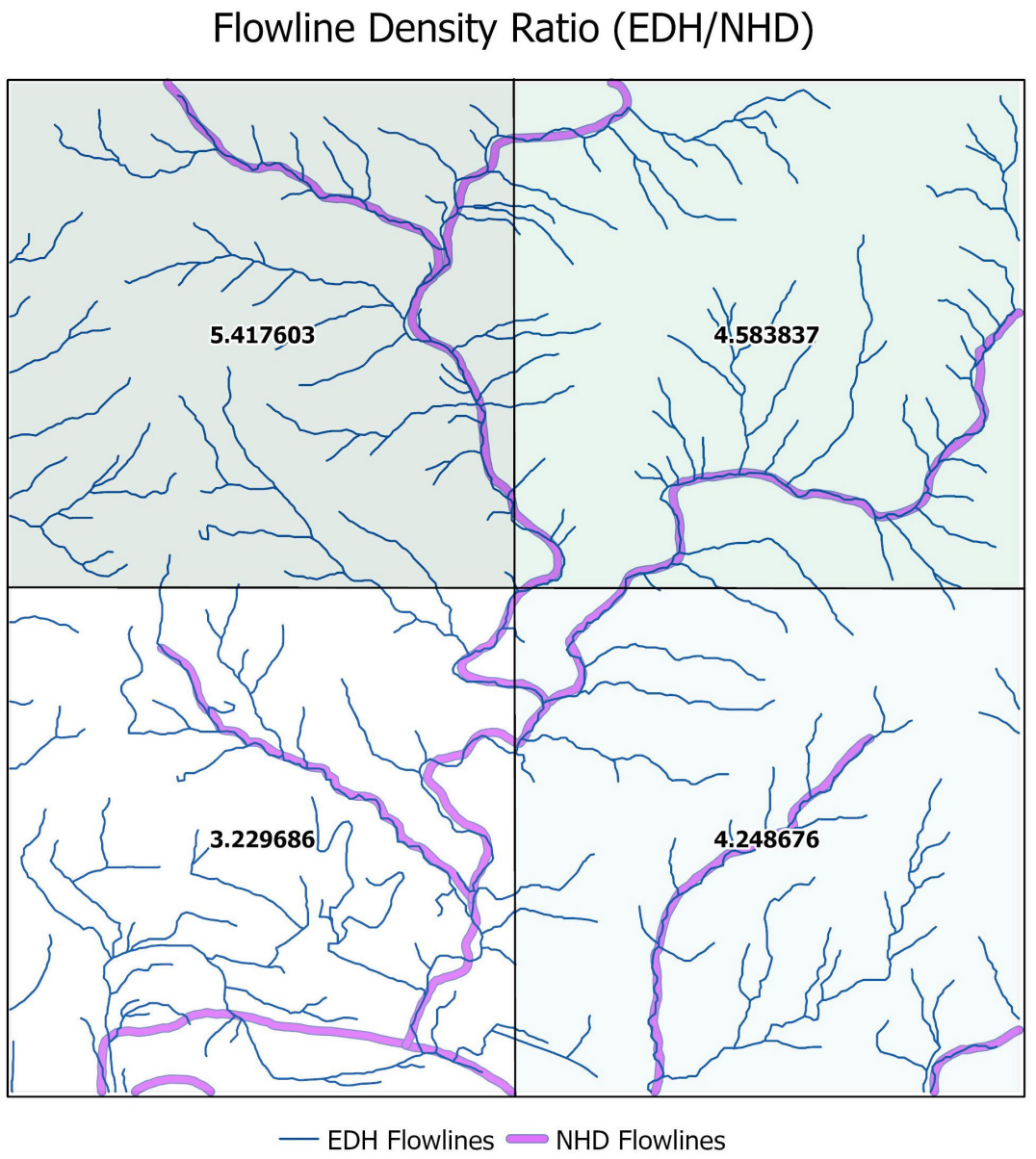
Tools to Support EDH Workflow

Tool Group	Tool Name	Tool Source	Environment	Auto-Correction Component
Surface Prep	Geoid 18 Transformation	NOAA-Modified/Custom	Windows	N/A
GMI	GMI	ESRI/Arcpy/Whitebox/Custom	ArcPro	N/A
Auto Breach Tools	Breach Barrier	ESRI/Arcpy/Custom	ArcPro	N/A
	Identify Breach Areas	ESRI ArcHydro	ArcPro	N/A
	Create Breach Lines	ESRI ArcHydro	ArcPro	N/A
Derivation Tools	Derive Streams	ESRI/Arcpy/Custom	ArcPro	N/A
	Derive Stream as Line	ESRI	ArcPro	N/A
	Identify Flat Areas	ESRI ArcHydro	ArcPro	N/A
	Geomorphons	ESRI	ArcPro	N/A
	Burn Flat Polygons into DEM	ESRI ArcHydro	ArcPro	N/A
	Interpolate Shape	ESRI	ArcPro	N/A
Edit Tools	Drain Edits	ESRI/Arcpy/Custom	ArcPro	N/A
	Barriers	ESRI/Arcpy/Custom	ArcPro	N
	Desicants	ESRI/Arcpy/Custom	ArcPro	N
	Seeds	ESRI/Arcpy/Custom	ArcPro	N
Compliance QA/QC	Short Segments	ESRI/Arcpy/Custom	ArcPro	Y
	Long Segments	ESRI/Arcpy/Custom	ArcPro	N
	Monotonicity	ESRI/Arcpy/Custom	ArcPro	Y
	Confluences	ESRI/Arcpy/Custom	ArcPro	Y
	GMI Compliance	ESRI/Arcpy/Whitebox/Custom	ArcPro	N
	Transects/Channel	ESRI/Arcpy/Custom	ArcPro	N
	DEM Faults	ESRI/Arcpy/Custom	ArcPro	N
	Density	ESRI/Arcpy/Custom	ArcPro	N
	NHD Omissions	ESRI/Arcpy/Custom	ArcPro	N
	Trace Network	ESRI	ArcPro	N

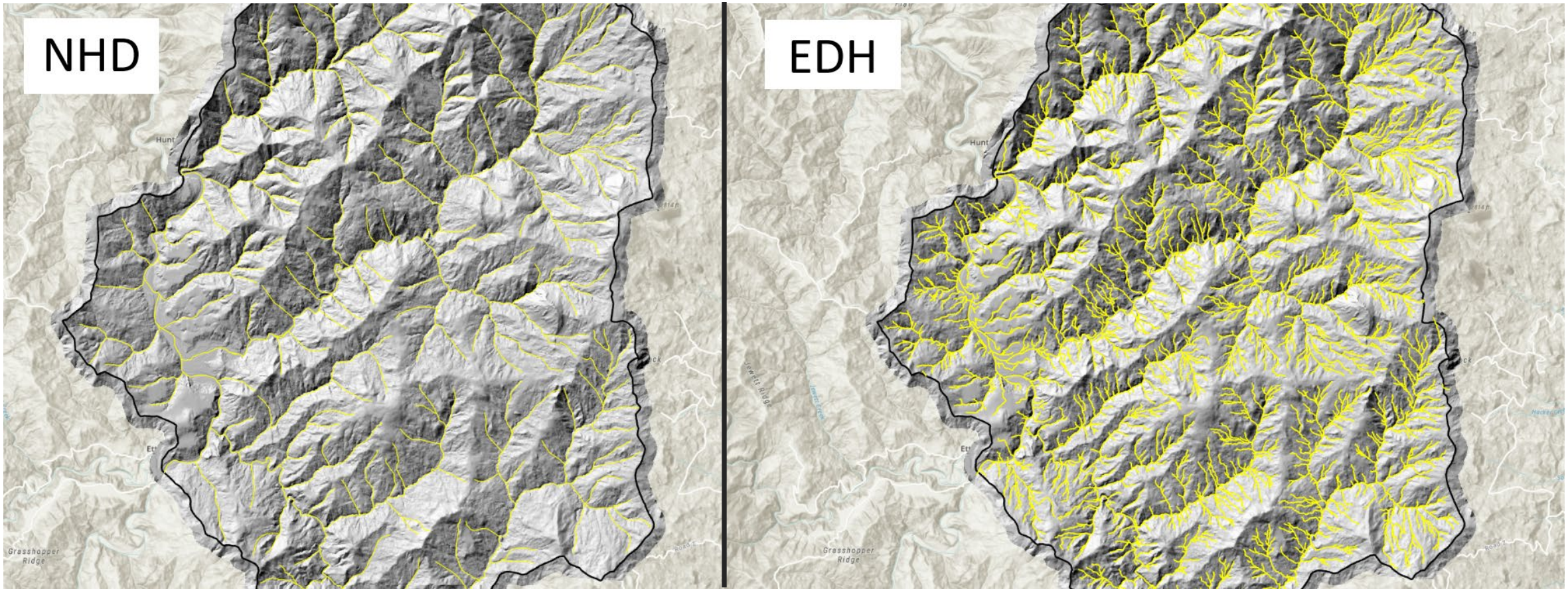
EDH-NHD Density Comparison

Density Visual Report

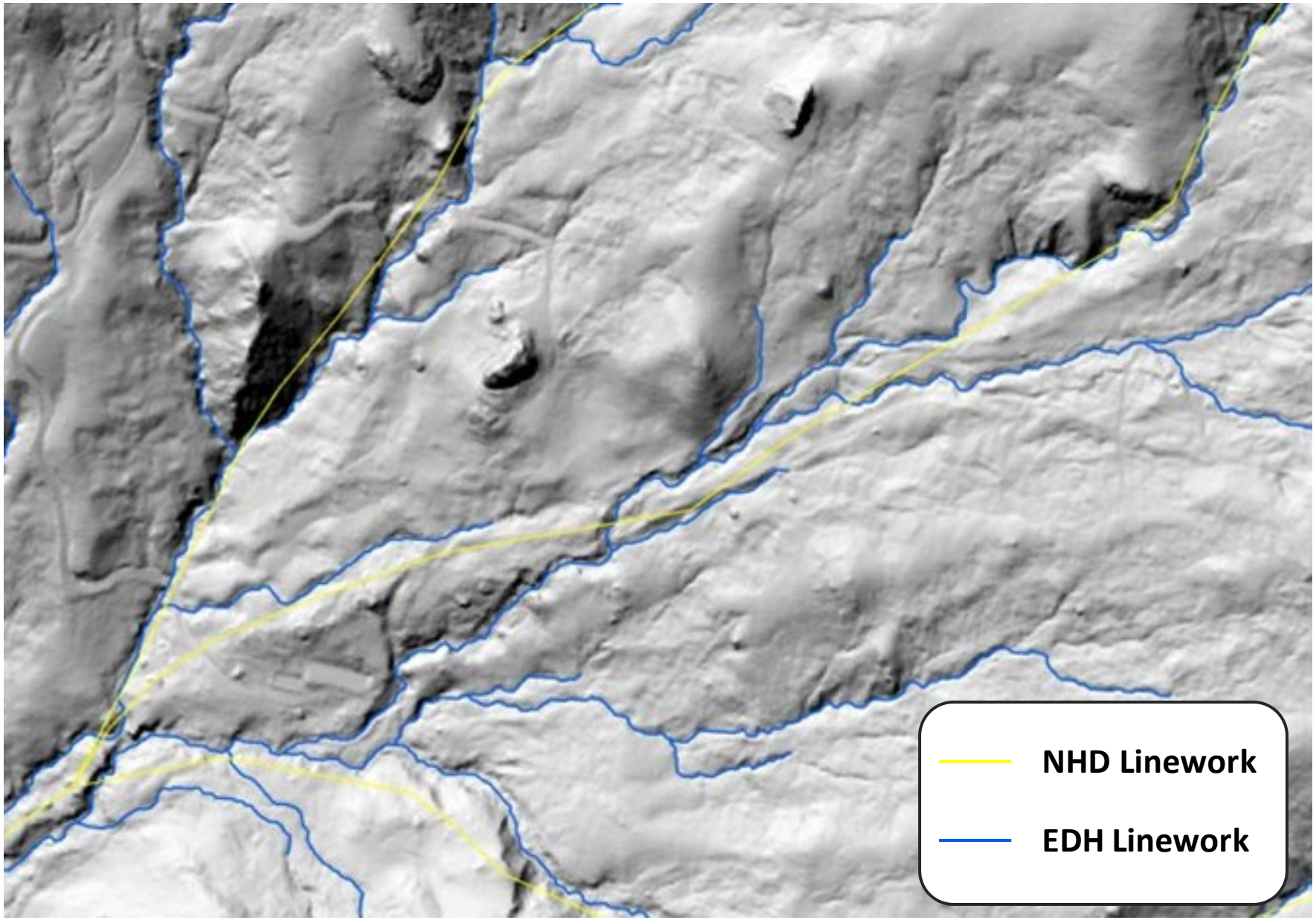
- *EDH should be a **higher resolution** and **denser** than high resolution NHD.*
- ***Density increase** in EDH should be **between 3 and 5 times** the density of NHD.*
- *This tool reports by grid at 1 square mile per cell.*
- *Shows **EDH overlaid on NHD**.*
- *Reports **density ratio** increase in EDH.*



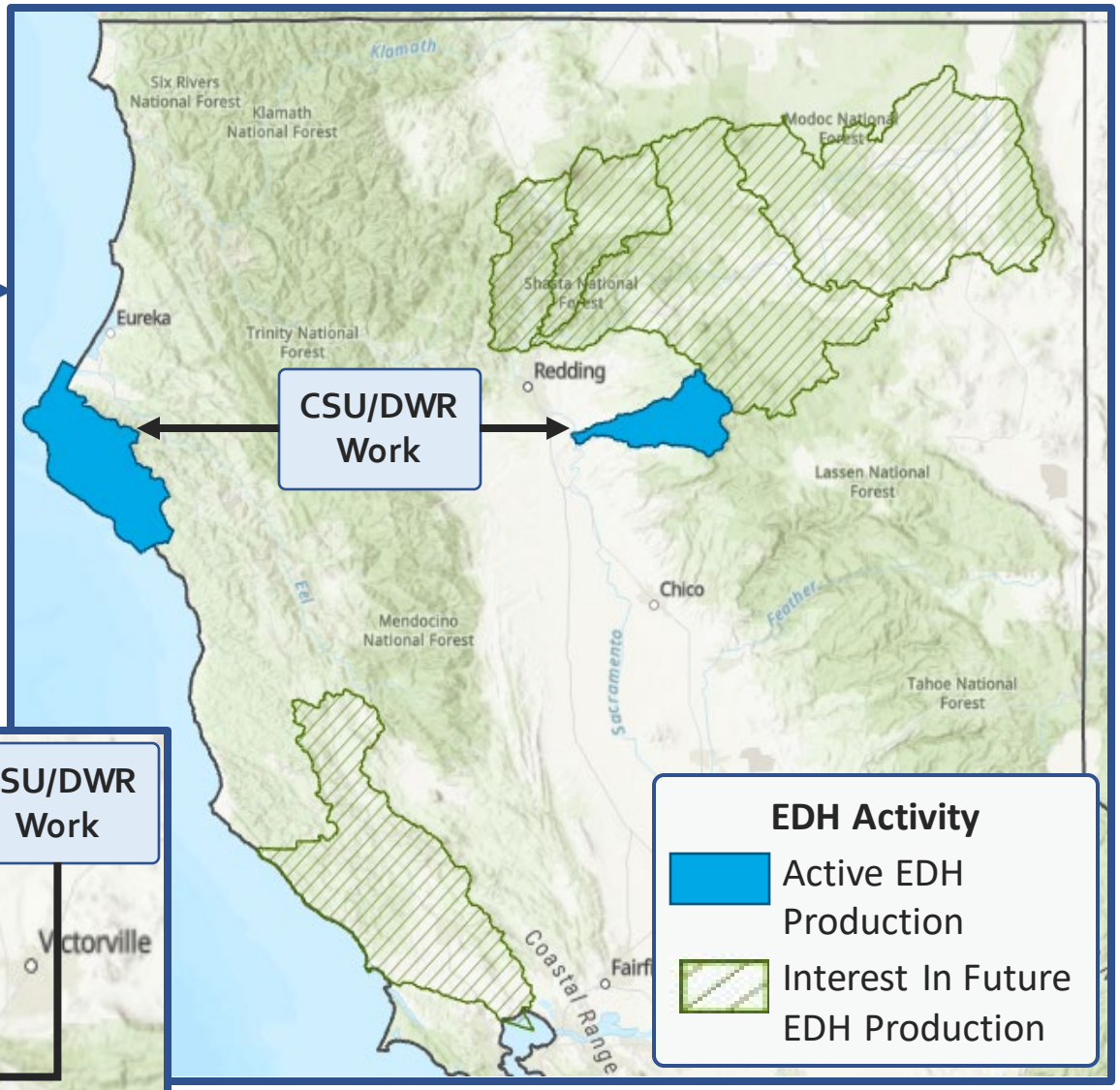
EDH-NHD Density Comparison

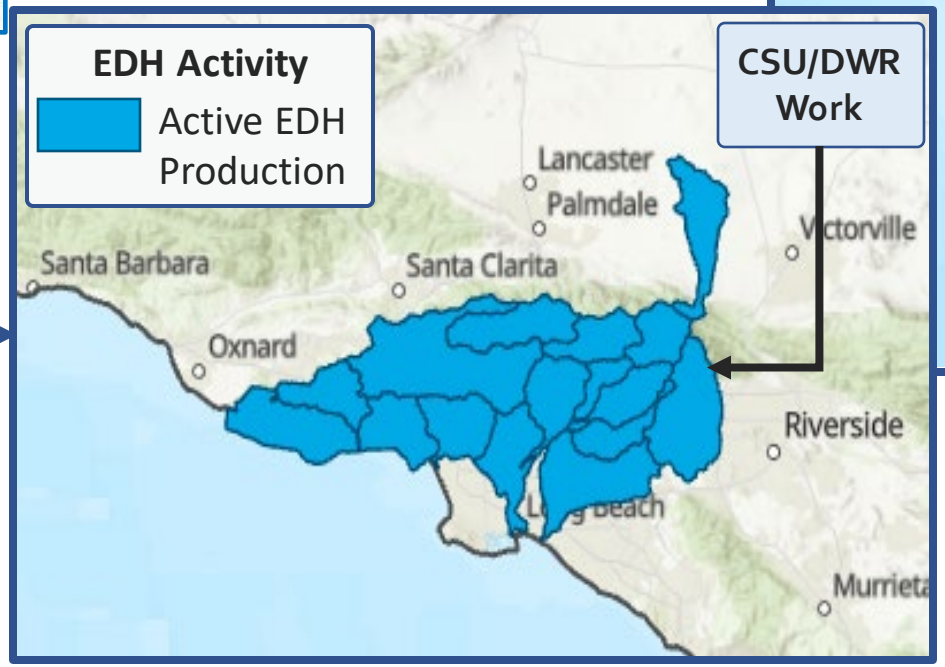


EDH-NHD Accuracy Comparison



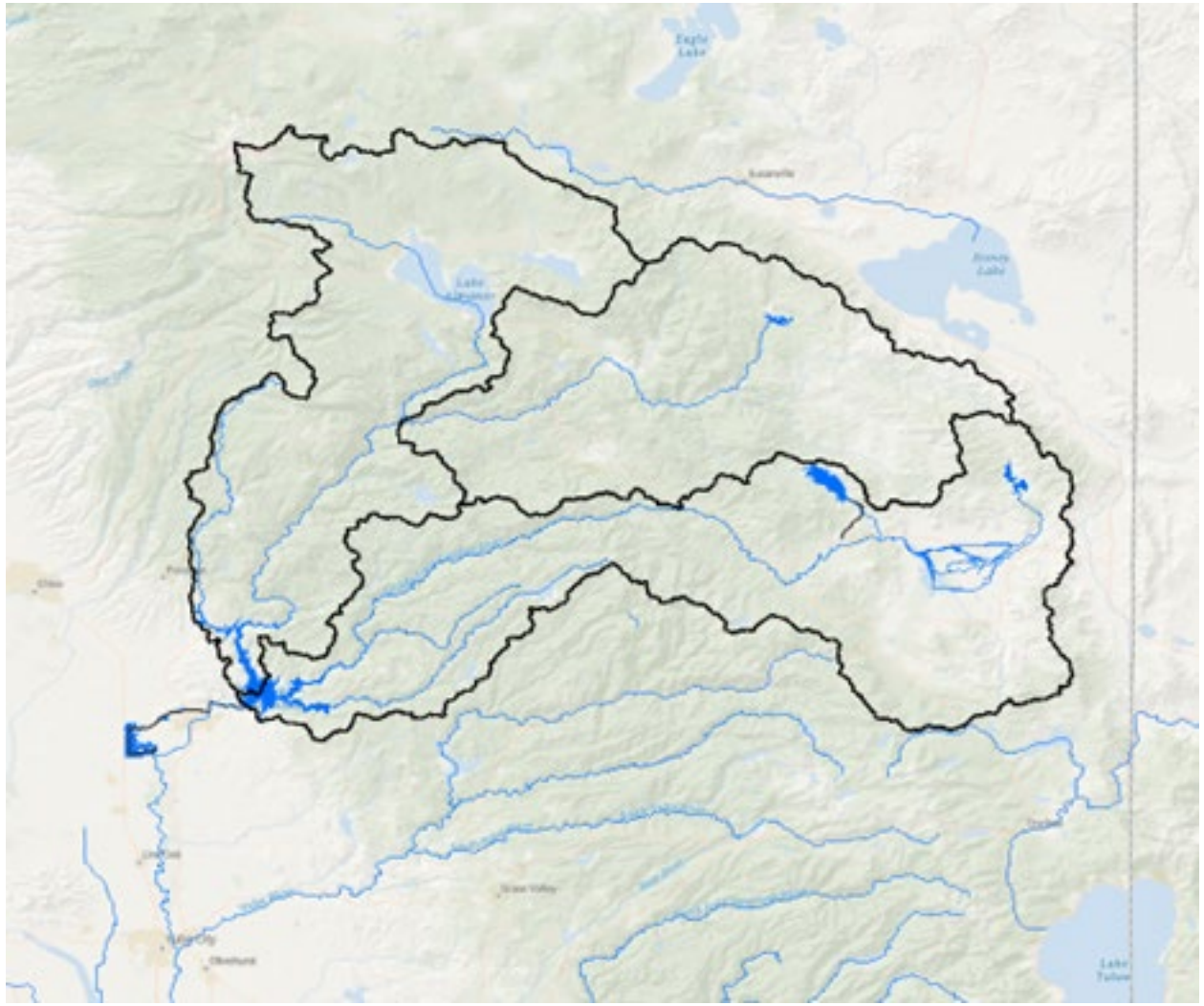
California EDH Status





Next Steps

- Submitted a DCA proposal for the Upper Feather River Watershed through USGS for 3DHP.
    - In collaboration with CA DWR (co-op agreement)
- Continue to work with USGS to meet their standards.
- Expand DWR EDH project areas.
- Continue outreach to work with others in the space.



Thank you!

Erik Fintel

efintel@csuchico.edu

Geographical Information Center

North State Planning and Development Collective

CSU, Chico

Joel Osuna-Williams

joel.osuna@csun.edu

Center for Geospatial Science & Technology

CSU, Northridge

Jane Schafer-Kramer

jane.schafer-kramer@water.ca.gov

Department of Water Resources