Sierra Nevada Earth Science Atlas

THE SIERRA NEVADA EARTH SCIENCE ATLAS (SNESA) is a collaborative project that showcases California's longest and tallest mountain range and its iconic geologic features. The project includes contributions from geoscientists of the U.S. Geological Survey and the California Geological Survey. The target audience includes researchers, applied geologists, geology students, geo-tourists, and the general public. The SNESA will include GIS data, map plates, and a pamphlet, all published by the CGS as Geologic Data Map 9.

This SNESA represents the most current, complete, and largest-scale, range-wide syntheses of geoscience data. All compilations are developed at a scale of 1:400,000 and can be grouped into five major components, summarized below.

Geologic map data were compiled and synthesized from numerous sources. Basement rocks are divided into tectonostratigraphic units, primarily terranes and plutonic complexes, many of which are subdivided into lithologic or tectonic sub-units. Younger overlapping strata are grouped into a series of sedimentary and volcanic rock and surficial units according to age, depositional environment, and (or) rock type. A separate polygon overlay depicts potential mega-landslides in the Owens Valley region.

New **gravity and aeromagnetic anomaly maps**, combined with a new compilation of rock density and magnetic susceptibility data, provide information on the depth extents of plutons and basins within and around the Sierra Nevada as well as fault continuity and cumulative offset.

A **geochronology database** was created to assist with mapping and interpretation, and to serve as a reference for others. We compiled dates from earlier published compilations and added more recent work, which helps illustrate the ages of the abundant Mesozoic intrusive rocks, the surrounding country rock, and overlapping strata.
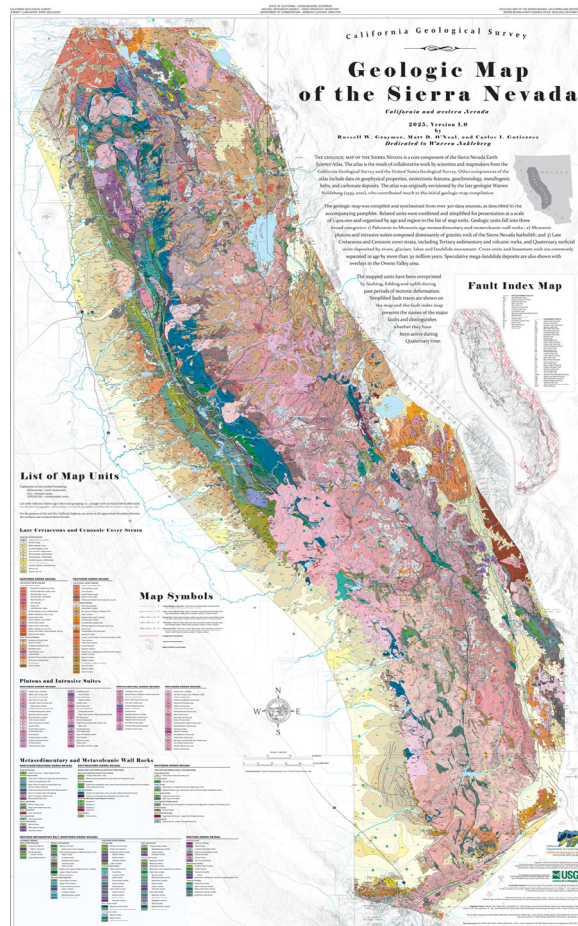

Above: a preview of Plate 1A, Geologic Map of the Sierra Nevada. Plate size is 42 by 66 inches. The entire Atlas will be available on the CGS web site by late 2025.

Facing page: a portion of Plate 1A shown actual size.

Economic geology data include metallogenic belts, carbonate deposits, and representative mines. Metallogenic belts depict areas that contain or are favorable for a group of coeval and genetically related, significant lode and/or placer deposits. The carbonate deposits database includes rock type, chemical composition, and other information.

Neotectonic features data include new map compilations of Quaternary active faults, historical earthquakes, recent volcanism, and geothermal features.

A sixth component, **Geosites**, will be released as a separate publication. Geosites are accessible sites the public can visit that illustrate and explain the broader scientific and cultural importance of geologic features representative of the Sierra Nevada.
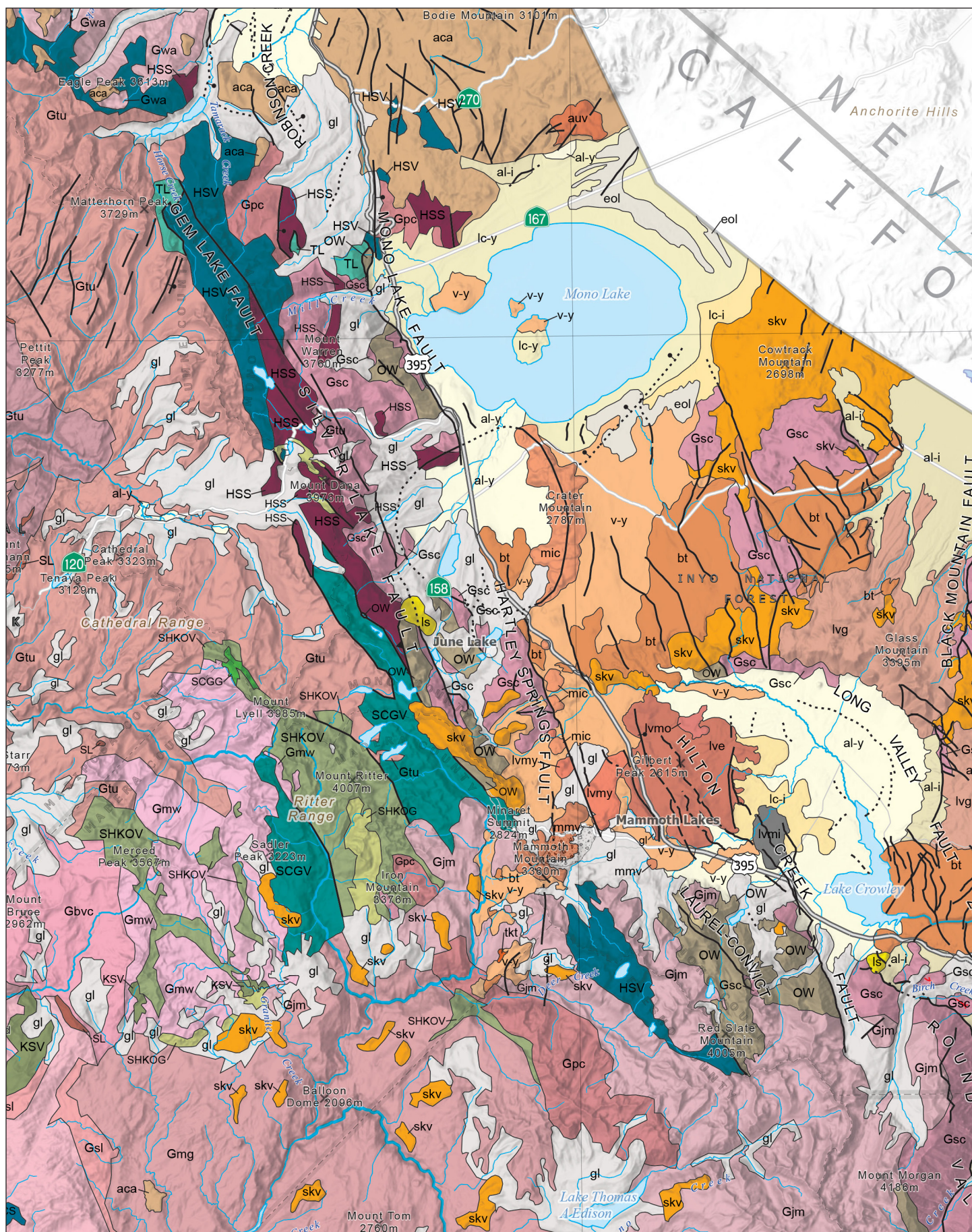
We dedicate this work to the late Warren Nokleberg, who initiated this project and made substantial contributions before his untimely passing.

— Matt O'Neal, PG
CGS Geologic and Landslides Mapping Program

List of SNESA Contributors in alphabetical order (asterisks denote USGS staff; all others are CGS):
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